Gulf Power Company
500 Bayfront Parkway
Post Office Box 1151
Pensacola, FL 32520-0781

C. I.

FILE COPY

Susan D. Cranmer
Asst. Secretary and
Asst. Treasurer

the southern electric system

June 12, 1996

Ms. Blanca S. Bayo, Director
Division of Records and Reporting
Florida Public Service Commission
2540 Shumard Oak Boulevard
Tallahassee FL 32399-0870

Dear Ms. Bayo

Pursuant to Order No. PSC-96-0023-FOF-EI in Docket No. 951433-EI, Gulf Power Company respectfully submits an original and fifteen copies of the requested storm study as described in paragraph 3 of page 2 of the Order. If you have any questions, please give me a call at (904) 444-6231 or Ronnie Labrato at (904) 444-6384.

Sincerely,

Susan D. Cranmer

ACK
AFA
A
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C
C
E
L

Enclosures

cc Beggs and Lane
Jeffrey A. Stone, Esquire

Gulf Power Company

Gulf Power

the southern electric system

Transmission & Distribution Study for Hurricanes

MARSH & McLENNAN

M&M Protection Consultants

May 1996

GULF POWER COMPANY

TRANSMISSION AND DISTRIBUTION STUDY FOR HURRICANES

EXECUTIVE SUMMARY

This study was performed to assist Gulf Power Company (GPC) in quantifying the transmission and distribution (T&D) system loss estimates from worst-case historical and stochastic (reasonably foreseeable worst-theoretical) hurricane events. The study utilized historical and projected hurricane data obtained from the computer modeling of the Insurance Risk Assessment System (IRAS), damageability criteria for T&D systems obtained from the Tri-State Hurricane Study, literature search and replacement cost values provided by GPC.

The 10 counties comprising the GPC service territory were considered in this study. Wind models were analyzed to estimate the greatest financial impact. Replacement values for the T&D systems in each county were utilized.

The results of the study concluded that the worst-case historical event since 1875 was an unnamed hurricane which struck the Florida coast on September 11, 1889. The model projects a $25.1 million loss to the GPC system if an event comparable to this unnamed event were to occur with today's replacement value costs. The expense portion of this event is $20.1 million once the $5.0 million capital costs are excluded.

The stochastic hurricane event was modeled using the present T&D assets at risk. The projected worst-case theoretical hurricane could result in a $106.9 million loss or $85.5 million for expense and $21.4 million as capital cost.

A third test was developed which is the cumulative average loss over time which is developed independently of the aforementioned projections. This shows that $1.3 million with $1.0 million for expense and $0.3 million as capital cost will be needed for the average annual losses to cover restoration costs.

A more useful benchmark is the 100-year storm. The probability of this storm occurring in this time frame is 63.2% and is projected to result in $36 million in property damage of which $28.8 would be needed to cover the restoration.

Based on our analysis, we offer the following conclusions:

- Increase the Property Insurance Reserve to $20.1 - 28.8 million. The accrual, therefore, should be increased from $3.5 million to $3.9 million annually. This is the result of accruing $2.9 million over a ten-year period to cover the worst-case hurricane and an additional accrual of $1.0 million, on average, to cover the more frequent but less severe events.

- As of December 31, 1995, Gulf Power Company's Property Insurance Reserve contained a negative balance of $7.5 million. Utilizing the $3.9 million annual accrual for 10 years, it is projected that the reserve balance will approximate $21.5 million which is within the recommended range.

GULF POWER COMPANY

TRANSMISSION AND DISTRIBUTION STUDY FOR HURRICANES

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TRANSMISSION AND DISTRIBUTION STUDY FOR HURRICANES

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PART I. INTRODUCTION

A. Purpose

The purpose of this loss estimate study is to help Gulf Power Company (GPC) analyze the loss potential to their transmission and distribution (T&D) system from a hurricane.

B. Scope

M&M Protection Consultants (M&MPC) developed this transmission and distribution loss estimate study based on historical hurricane patterns impacting the 10 counties served by GPC. This historical data is based on the M&MPC wind models described below. This study also evaluates the reasonably foreseeable worst-theoretical or stochastic hurricane event impacting the GPC service area.

This study does not address other natural hazard events that could cause property damage to the T&D system, such as fire, flood, geomagnetic disturbances, ice, glaze, snow, tornado, earthquake and severe storms, including noncyclonic windstorms.

C. Background and Authority

This study originated from a verbal request for a proposal and a subsequent written proposal to Gulf Power on January 17, 1996. The proposal was accepted in Gulf Power Company's letter to M&MPC on January 26, 1996. This correspondence is included in Appendix A. Subsequent telephone discussions refined some of the parameters used in this study.

D Methodology

The study was completed by an M&MPC project team using (1) wind models available to M&MPC; (2) damageability criteria for T&D systems; (3) literature search and (4) replacement cost values provided by GPC.

1. *Project Team*

The following M&MPC personnel provided technical input and analysis for this study:

- Cheryl J. Fanelli, Computer Systems
- Leonard R. Hathaway, Project Manager
- Charles A. Pacella, Natural Hazard Analysis

2. *Insurance Risk Assessment System (IRAS)*

The IRAS is a knowledge-based expert system that assesses the financial risk due to catastrophic natural hazards. IRAS provides consequence modeling in addition to historical frequency and intensity data for earthquake and hurricane. IRAS is a joint venture developed between Risk Management Solutions, Inc. at Stanford University and a consortium including M&MPC.

The IRAS model addresses site-specific hurricane damage caused by peak wind velocity. This information is primarily derived from publicly available sources and is augmented, where appropriate, by proprietary information and primary research.

IRAS adds specific event parameters to the Saffir-Simpson method of classification recognizing that not all hurricane effects are the same. This additional information, such as landfall speed and direction, radius to maximum winds (distance from the "eye" of the hurricane to the "wall") and forward direction and speed provides a more accurate estimate of potential loss.

The supporting data for IRAS was obtained from voluminous quantities of raw data that is collected by government sources. The hurricane source data has been gathered by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA).

The IRAS wind model is point-specific in that it can develop the historical or "felt" intensity for any location with the only input being latitude and longitude. This would be adequate for determining the exposure to a point-specific location such as an electric generating station. However, a T&D system obviously covers a widespread geographic area and a method had to be found to apply IRAS to an area. For this analysis, the GPC service area was broken down into its component counties. Using software for geographic mapping, the center of each county was determined. The data for each hurricane simulation was then applied to the center of each of the counties in the service area.

The limitations of the IRAS model, like any model, need to be recognized. This is a consequence estimating model and as such, it is not a model of the actual physical event; but, rather of the financial consequences of that event. As with all such models, the resulting consequence estimates can be significantly affected by small changes in the input parameters. While the parameters selected are believed to be reasonable for the model and situation, it must be kept in mind that the results are not absolute. Therefore, the consequence estimates should be taken as only an indication of the extent or order of magnitude of the potential consequence. The actual consequence may be more severe than under the reasonably foreseeable conditions assumed.

3. ***Damageability***

As the intensity level of a hurricane increases, the level of damage to the T&D system will also increase. The question is how will the T&D system respond to various wind speeds.

The Tri-State Hurricane Project and other studies sponsored by the Federal Emergency Management Agency (FEMA) helped answer the question of quantifying the damage inflicted on various "life-line" systems from hurricane-induced winds, surge and flooding. Based on these studies and related studies by the Applied Technology Council, but not actual loss experience, a generic response was developed — one response each for the individual transmission and distribution lines. The concept of damageability underlies the fact that each of these life-lines responds differently to the same wind speed.

The damageability curves were discussed with GPC and were determined to be applicable to the T&D systems. They are displayed in Appendix C.

4. ***Values***

The monetary value of the T&D system constitutes the assets at risk to hurricane forces.

The T&D replacement cost values (RCV) were provided by GPC in their transmittal letter of February 22, 1996. Replacement cost values were calculated by multiplying $155,000 per circuit mile times 1,544 miles of transmission line. The distribution values were calculated by multiplying $97,000 per pole mile times 5,304 miles. Table 1, "T&D Replacement Costs by County", displays the data. The percentages by county of transmission were provided by GPC. The distribution values were calculated based on the number of customers per county

The replacement cost value of the capital equipment (towers, poles, transformers and conductors) was used to develop the expense associated with the T&D post-hurricane system restoration operations. This would include the cost of labor for GPC and foreign crews, tree contractors, logistics and transportation, etc.. Based on the 1995 experience with the restoration from Hurricanes Erin and Opal, it has been determined that the costs are 20 percent capital and 80 percent expense related. Therefore, all projections in the study have been discounted by 20 percent to account for the capital expenditures that will be amortized over the life of the equipment.

E. Definitions

Damageability - This term represents the amount of damage to a transmission or distribution system that is anticipated at various hurricane intensities (also see the discussion of damageability in Part I, D.3).

Hurricanes - Cyclones that originate as tropical storms over water with wind speeds reaching 74 miles per hour or more are considered "hurricanes." They are measured by wind speeds on the Saffir-Simpson Hurricane Scale of 1-5. Mean wind speeds are from 74 mph to more than 155 mph. Peak gust winds may exceed maximum sustained winds by 20-40%.

IRAS relies on historical data that is segmented into categories using the Saffir-Simpson Hurricane Scale. For a description of the effects see Appendix D

SAFFIR-SIMPSON HURRICANE SCALE

Category	Wind Speed Range (mph)	Relative Severity
Tropical depression	32 - 38	0.25
Tropical storm	39 - 73	1.00
SS-1	74 - 95	2.30
SS-2	96 - 110	3.40
SS-3	111 - 130	4.60
SS-4	131 - 155	6.50
SS-5	over 155	8.70

The relative severity from different intensities increases with wind speed. The force of the wind increases in proportion to the square of the velocity making an 80-mph wind four times as powerful as a 40-mph wind and a 160-mph wind sixteen times as powerful.

National Oceanic & Atmospheric Administration - NOAA was established as part of the Department of Commerce on October 3, 1970. The mission responsibilities of NOAA are to monitor and predict the state of the solid earth, the oceans and their living resources; the atmosphere and the space environment of the earth; and to assess the socioeconomic impact of natural and technological changes on the environment.

Probability of Non-Exceedence - A number indicating the probability that the actual damage ratio for a hurricane, or a random event, will not exceed the damage ratio.

Stochastic hurricane event - This is an estimate predicted by the IRAS wind model that quantifies the severity of the "reasonably foreseeable worst hurricane event" that could theoretically occur based on the distribution of GPC values and meteorological conditions. It presupposes that this event will occur without regard to probability. While it is conservative, it should be recognized that even more extreme events could be postulated.

Therefore, it is qualified as "reasonable" because it takes into consideration both meteorological conditions and value distribution.

Worst-case historical hurricane event - This is the worst hurricane event that has ever occurred in terms of potential damage to the 10-county GPC service area as modeled and projected by IRAS, based on the current value distribution of the transmission and distribution system.

PART II. ANALYSIS

A. Overview

Hurricanes are unpredictable events with respect to a host of variables:

- Damage potential
- Forward speed
- Frequency
- Intensity
- Size
- Track

Frequency predictions can also be influenced by worldwide events, such as volcanic activity and possible global warming. One hundred years of statistical data may be too short a horizon for attempting to determine meaningful return periods. Probabilities may also be misleading because they offer no assurance that another hurricane event in successive years, or the same year, of equal or greater size could not impact the same geographic area. A case in point is the 1995 impact of hurricanes Erin and Opal on the GPC service territory.

In recent years, the dollar amount of property losses has been escalating as evidenced by the destruction of Hugo in 1989 being overshadowed by Andrew in 1992. Further, Andrew was a relatively compact but very fierce hurricane, and was the third most intense event of the century.

The uncertainty of the data must be recognized. However, the data compiled using state-of-the-art wind models and other resources does provide useful insight into the magnitude of the transmission and distribution damage event that can be expected.

B. History of Hurricanes in GPC Service Area

According to NOAA, there have been 155 recorded hurricanes that have had landfalls on the U.S. Gulf and East Coasts from 1989 to 1992. Table 2 has been extracted from NOAA data and is presented on the following page.

Table 3 displays historic hurricane events that have had an impact on the GPC service area. The financial impact of these hurricanes is also presented where it is available. Figures 1 through 5 graphically show the tracks of each of the eight hurricane events.

Of the hurricane events that have directly struck the Florida panhandle (i.e., made landfall), seven have been major storms, all of which were SS-3's. Hurricane Camille in 1969 is one of only two SS-5 hurricanes that have struck the U.S. Gulf and East Coast and passed near GPC service territory, but did not strike it.

It should be noted that there have been other hurricane events or near misses that are not reported in either Tables 2 or 3. However, the IRAS wind model considers historical events even if the Florida panhandle was not the first state experiencing the direct impact of the hurricane.

The time interval between the 27 hurricane events range from 12 years (1941-53) to two storms in one year — Erin and Opal (1995), Dora and Hilda (1964) and three storms — Elena, Juan and Kate (1985). The historic hurricanes are displayed for 25 year segments, except for the most recent segment which has 20 years.

Hurricane Events
25-Year Periods

25-Year Period	Events
1875 - 1900	4
1900 - 1925	5
1925 - 1950	4
1950-1975	7
1975 -1995	6

Twenty-seven events, when averaged over a period of 120 years, may suggest a return period of one hurricane for every four years. This can be misleading as demonstrated in 1964, 1985 and 1995.

C Worst-Case Historical Hurricane Event

The worst-case historical hurricane since 1875 occurred in 1889 which passed through Escambia and Okaloosa Counties. The track and wind speeds are shown in Figure 6. The storm selected by the IRAS model is a SS-2 The forward speed of this event indicates that it is a fast moving storm which translates into peak gust windspeeds exceeding 111 mph which places it in the SS-3 range.

Table 4 displays the results of applying the wind model to the GPC T&D system The various headings in Table 4 are explained below.

Peak gust at site This is the peak gust wind speed projected by the model for the center of the county which may be several miles inland from peak gusts experienced along the coastline. Also considered is the topography and the effects of ground roughness. The center of the county was selected by determining the latitude and longitude from MAPINFO and WESSEX mapping software

Reported transmission and distribution values. These are the replacement cost values used by the model and transferred from Table 1.

Projected transmission and distribution mean losses. These are the model's projected damage in millions of dollars by transmission, distribution, county and summed for the system.

As can be determined from Table 4, the model is projecting a \$25.1 million loss with \$20.8 million expense and \$5.0 million in capital costs to the GPC system if an event comparable to the 1889 event were to occur with the replacement cost value for today's T&D system.

D Stochastic Hurricane Event

The model also projects the impact of a more severe storm on the current assets at risk. This is the stochastic or reasonably foreseeable worst-theoretical hurricane event. The model chooses the worst-case meteorological event based on the distribution of the T&D assets. The track and projected wind speeds by county are shown in Figure 7. Table 5 displays the financial impact by county, transmission, distribution and summed for the GPC system. As can be noted the model is projecting damage of \$106.9 million with \$85.5 million as the expense and \$21.4 million for capital costs. The projected damage is over four times greater than the projected loss from the worst-case historical event noted in Table 6.

The demographics of the GPC service territory indicate that two-thirds of the distribution system are concentrated near the coast of Escambia (45%) and Okaloosa (21%) counties, respectively. This is significant as these are the first two counties impacted by the worst-foreseeable hurricane. The level of damage may also be influenced by variables that are not considered in the model such as vegetation encroachment and tree-trimming operations.

To help put the magnitude of the stochastic event into perspective, consider the following quote from the Insurance Information Institute publication, "*Insurance Issues Update*", February, 1996:

> *"Before Hurricane Andrew struck the south Florida coast on August 24, 1992, many experts thought the worst-possible windstorm would cause no more than about $8 billion in insured property damage. Prior to Hurricane Hugo in 1989, which cost $4.2 billion, no hurricane had resulted in claims in excess of $1 billion. The ultimate price tag for Hurricane Andrew was more than $15.5 billion, twice as large as earlier estimates for hurricanes. If the hurricane had hit a major metropolitan area, such as Miami, damage claims could almost certainly have been closer to $50 billion."*

The aforementioned reference also enumerated the Ten Most Costly Insured Catastrophes, U.S., which we have included in Appendix E.

Based on M&MPC's proprietary Gas & Electric Utility Large Loss Database, we have estimated below the T&D damage to the U.S. mainland utilities from the most recent 11-year period. This is a review of some of the major hurricanes during this period.

Hurricane T&D Losses
1985-1995

Year	Hurricane	Dollars (Millions)
1985	Gloria	$148.9
1989	Hugo	$161.3
1991	Bob	$82.7
1992	Andrew	$390.6
1995	Erin	$16.7
1995	Opal	$68.1

The loss estimates include capital and expense and figures have been trended to 1995 dollars using the Handy Whitman Index

E. Probabilities

News media accounts of the 18th Annual Hurricane Conference held in Orlando earlier this year heard William Gray, professor of atmospheric science at Colorado State University give his initial projections for the 1996 hurricane season. He predicted eleven storms will form and seven will become hurricanes with two classified as severe. These projections are half of those experienced in the 1995 season, which saw the most activity in 62 years. It should be noted that Hurricane Andrew, the most costly event in this century, occurred in a relatively quiet year where only six named storms were formed. Gray has an accuracy rate of 80% and bases his projections on the world's climate, but does not predict if or where the storms will strike land.

The frequency of Atlantic and Gulf Coast hurricanes has been linked to the amount of rainfall in West Africa according to Gray's statistical studies. While statistical links are of interest, even with solid historical data, projecting the frequency, severity and damage potential of future hurricanes is filled with uncertainties. This is the nature of low frequency, high severity events of any type.

To put the projections in perspective, cumulative probability of occurrence curves were generated by IRAS for stochastic hurricane events for time periods of 1 through 500 years. This is displayed in Table 5. While the probabilities may be small, the fact that they are greater than zero indicates that these can indeed happen. For example, an often used benchmark in the practice of risk management is the "100 year" storm. Statistically, the probability of such a storm occurring in a 100-year time frame is approximately 63.2%. Looking at the 100-year probability column of Table 6, a 100-year probability of 63.2% is equivalent to a $36 million loss event with $28.8 million impact on expense and $7.2 million capital costs.

The challenge of selecting the optimal level of annualized funding to offset the restoration cost to the T&D systems from future hurricane events is difficult at best. As discussed above, hurricanes are random events with a variety of significant variables. The data presented may lead to the conclusion that these events impact the GPC service area about every four years. Caution is advised in utilizing this as a measure of return period as it is based on a rather narrow window of hurricane historical loss data over the last 120 years.

In 1995 GPC experienced the exceedingly small probability of back-to-back multi-million dollar major hurricane occurrences in the same year.

In selecting a prefunding level, one must also consider another scenario that postulates several costly but less than catastrophic events that occur over a period of ten years. The aggregate property damage for these multiple hurricane events could far exceed any practical level of prefunding.

The table displayed below has been generated by the IRAS model to consider cumulative average loss over a span of time for stochastic events. This means that, excluding peaks caused by "large loss events", GPC would have to fund $1.3 million with $1.0 million for expense, and $0.3 million for capital cost per year for "average" losses. This would be over and above funding for any large loss event.

Cumulative Average Loss Over Time

Time Span (Years)	Cumulative Average Loss ($)
1	1,300,000
5	6,300,000
10	12,700,000
25	31,700,000
50	63,500,000
75	95,200,000
100	127,000,000
150	190,400,000
200	253,900,000

The validity of the above display can be demonstrated by comparing it to GPC actual hurricane restoration expenses over the last quarter century. From Table 3 the sum of trended costs for the eight storms is $37 million or $30 million for expense only. The Cumulative Average Loss Over Time as predicted by the IRAS model is $31.7 million with $25.4 million as expense and $6.3 million as capital cost for 25 years.

F Establishing a Reasonable Accrual Level

A reasonable accrual level should consider two distinct scenarios. For our analysis, we have selected a 10-year time horizon as a reasonable period. The first scenario is to provide for the 100-year storm of $28.8 million rounded to $2.9 million per year. The second scenario is to provide for the more frequent but less severe events for $1.0 million annually. The combination of these two scenarios results in a required accrual to reserve in the amount of $3.9 million annually.

The Property Insurance Reserve should be increased to a level ranging from $20.1 to 28.8 million. This will allow recovery of the worst-case historical event since 1889 which is projected to be $20.1 to the upper limits of $28.8 million for the recovery of the 100-year benchmark hurricane.

The increased annual accrual of $3.9 million should have a positive effect on the Property Insurance Reserve which contained a negative balance of $7.5 million as of December 31, 1995. After 10 years, it is projected that the balance will be approximately $21.5 million and falls well within the recommended range of $20.1 to 28.8 million.

Consideration should be given to indexing the level of funding. All projections described above are stated in constant 1995 dollars. The fund should be indexed to reflect capital investment in the T&D system (assets at risk) and increased cost to repair.

The downside risk is the occurrence of a highly unlikely but theoretically possible (stochastic) storm requiring GPC to withstand unfunded repair costs, at the same time suffering an undetermined loss of revenue from lost customers.

G SUMMARY

Based on this analysis it is prudent for GPC to continue to accrue for future hurricane events. If the worst-case historic hurricane (1889) were to occur today, the projected storm damage as predicted by the IRAS financial model is $25.1 million or $20.1 million for expense. The analysis also shows that if a worse storm occurred (stochastic), GPC could be expected to fund the restoration of a $106.9 million hurricane event with $86 million for expense. A third test is the cumulative average loss over time which is developed independently of the aforementioned projections. In this case $1.0 million will be needed to fund for average annual losses each year. However, a more commonly-used benchmark in the practice of risk management is the 100-year storm. The probability of this storm occurring in this time frame is 63.2% and is projected to result in $36 million in property damage including $28.8 million in expense. Based on our analysis we recommend that the annual contribution to the fund be increased from $3.5 million to $3.9 million to consider the 100-year storm and the more frequent but less severe hurricane events. The $3.9 million annual accrual should result in a reserve balance of $21.5 million after 10 years, which is within our recommended range of $20.1 to 28.8 million.

APPENDIX A

M&M Protection Consultants Proposal Letter dated January 17, 1996

Leonard R. Hathaway
Senior Vice President

M&M Protection Consultants
3400 Georgia-Pacific Center
133 Peachtree St., N.E.
P.O. Box 105008, 30348-5008
Atlanta, Georgia 30303-1808
Telephone 404 526 8808
Telefax 404 526 8802

January 17, 1996

MARSH & McLENNAN

Mr. R.R. Labrato
Controller
Gulf Power Company
500 Bayfront Parkway
P. O. Box 1151
Pensacola, Florida 35520-1151

Dear Mr. Labrato:

SUBJECT: **TRANSMISSION AND DISTRIBUTION SYSTEM HURRICANE STUDY**

INTRODUCTION

This is in response to our January 10, 1996 conference call with Gary Meggs of Southern Company. Gulf Power Company desires a hurricane study to aid in establishing an annual accrual to fund for future transmission and distribution damage. M&MPC proposes to meet your needs by providing an independent third-party hurricane impact analysis of Gulf Power's transmission and distribution system. In conducting this study, M&MPC will utilize various resources including our hurricane wind models that consider the frequency and severity of historical hurricane events.

SCOPE OF SERVICES

M&MPC will analyze the hurricane exposure to the 10 counties Gulf Power Company serves in the State of Florida. Our analysis will be based on the worst historical hurricane for the service territory. For expediency we are utilizing a county population subdivision in lieu of a more detailed customer-by-zip-code methodology.

The sophistication of our hurricane wind models will allow us to separately project damage to the transmission and distribution systems.

We will adopt the following conventions that were described in the LINE Insurance Company, Information Circular, June 1993, with a Gulf Power Company option of providing data that more adequately reflects your system.

- The distribution of values throughout the 10 county service territory will be determined by a population correlation. Gulf Power has the option of providing actual customers, population or line miles by county to M&MPC before the study begins.
- Damageability curves developed for LINE will be utilized unless Gulf Power provides amended curves to M&MPC before the study begins.
- The cost to replace the transmission and distribution system will be $240,000 per circuit mile for transmission and $135,000 per pole mile for distribution. Based on your recent experience with hurricanes Erin and Opel, it may be adviseable to use more up-to-date information on restoration costs.

The study will be conducted for various time windows for periods of 5, 10, 15, and 20 years and unbounded for the worst historical case. In addition to the maximum historical loss we will also provide an estimated maximum loss or worst probable hurricane event for the transmission and distribution system. This will also include a relative indicator of the likelihood of occurrence.

We will display in tabular form a summary of all hurricane events that have impacted the service territory since 1900. This data will include the year, name of the storm, if any, and the Saffir-Simpson category. Utilizing our computer aided graphics capability we will also display the hurricane events by superimposing their tracks on a map of the Gulf Power Company service territory.

DELIVERABLES

The deliverable will be a report including the graphics that present the results of our analysis as outlined above. The number of copies will be determined at a later date by mutual agreement. In addition, we will also reserve up to the equivalent of one half day of our staff's time for over the telephone consultation following the delivery of the report. If additional time is considered necessary, including on-site meetings with the Gulf Power staff or regulators, we would be pleased to entertain your requirements for an expansion of our services.

MANAGEMENT OF SERVICES

The services offered will be managed by Leonard R. Hathaway, M&MPC-Atlanta. He will be supported by Charles A. Pacella, National Coordinator for Natural Hazards, Alan S. Dean, National Coordinator for Computer Systems and Applications.

Mr. R.R. Labrato
January 17, 1996
Page Three

SCHEDULE

According to the Florida Public Service Commission's January 8, 1996 notice, the study is to be provided to that body by July 8, 1996. Therefore, M&MPC would like to suggest the following schedule:

January	-	Finalize contract arrangements
February	-	Gulf Power to submit data to M&MPC
March	-	M&MPC to conduct analyses and develop draft report
April	-	Gulf Power to critique draft report
May	-	M&MPC to finalize report
June	-	M&MPC to deliver final report

COST OF SERVICES

The cost of the study including the analysis, computer time, computer aided drafting, report preparation, post report consultation, telephone, fax and postage expense is $8,400. An invoice will be submitted after report transmittal with payment due in 30 days.

Thank you for the opportunity to serve Gulf Power Company. We look forward to your authorization to proceed with this study.

Sincerely yours,

Leonard R. Hathaway

Leonard R. Hathaway

krm

Enclosures

Copies to Gary Meggs, Southern Company Services, Inc.
Walter Gilstrap, MMI-Atlanta
Charlie Pacella, M&MPC-Chicago

PROFESSIONAL PROFILE

LEONARD R. HATHAWAY

Senior Vice President and Managing Consultant
Southeast Manager
Atlanta

Mr. Hathaway joined M&M Protection Consultants in 1970 and is currently the manager of M&MPC in the Southeast.

During his tenure with M&MPC he has held several managerial and staff positions related to risk management for gas and electrical utilities. He serves as the M&MPC practice leader for the utility and power production industry with responsibility for state-of-the-art hazard control consulting services, assuring client satisfaction, new services and business development.

Mr. Hathaway has authored papers that have been published in several utility publications on fire protection for coal-fired electric generating plants, turbine-generators and fire protection for hydroelectric generating plants. He has also addressed various utility organizations on these and related subjects.

Hazard control consulting assignments include facility surveys and evaluations to develop specific hazard control guidance. Other assignments include proposed facility plan review, system risk assessment and fire protection system evaluation. Mr. Hathaway also participates in various projects and studies relating to hazard control for utility sponsored industry mutual insurance companies. In 1991 he was selected to be a member of the U.S. delegation that visited the USSR in exchanging technical information on fire safety for nuclear power plants.

Mr. Hathaway holds a B.S. degree from the University of Rhode Island and an MBA degree from the University of Chicago.

Mr. Hathaway is a member of the National Fire Protection Association and served as Chairman of the Technical Committee on Fire Protection for Electric Generating Plants for 17 years. Currently, he is chairman of the NFPA Technical Committee on Atomic Energy, serves on the American Society of Mechanical Engineers Committee on Gas Turbine Procurement, is an associate member of the Society of Fire Protection Engineers and a member of the American Nuclear Society.

1/96

PROFESSIONAL PROFILE

CHARLES A. PACELLA
Vice President and Senior Consultant
Coordinator - Property Services
Coordinator - Natural Hazards Information System

Chicago, Illinois

Mr. Pacella is the Coordinator of M&MPC's property services. He also provides specialty consulting services to major utility, petroleum and chemical clients. This includes risk management audits, facility design and plan reviews, hydraulic analysis, vapor cloud dispersion analysis, vapor cloud explosive overpressure, loss estimate studies, catastrophic risk assessments, natural hazards vulnerability analysis, and special projects.

Mr. Pacella designed and implemented Marsh & McLennan's computerized Natural Hazards Information System for quantifying the exposure to facilities from natural hazards. As part of this, he developed a quantitative approach for calculating the probability and severity of property damage potential and business interruption loss potential of natural hazard events impacting on client properties around the world.

His expertise also extends to offshore drilling operations and to hazards analysis for large petrochemical facilities in many foreign locations. Projects include management safety system audits of offshore drilling and production operations, site surveys and loss estimate analysis for large petrochemical facilities, new facility design specifications, loss prevention engineering guidelines for major petrochemical clients, HAZOP studies, probabilistic risk assessments, and catastrophic loss analysis.

He is a member of the NFPA, ATC, and AICHE. He has served as a member of the Chemical Management Advisory Panel and as an instructor in the Dale Carnegie courses. He received a Bachelor of Science degree in Chemical Engineering from Case Institute of Technology, where he continued graduate work in marketing.

October, 1994

PROFESSIONAL PROFILE

ALAN S. DEAN, CDP
Vice President
National Coordinator - Systems and Applications
Chicago, Illinois

Mr. Dean currently serves as the National Coordinator - Systems & Applications for M&M Protection Consultants, overseeing the development and implementation of various computer application systems. He also performs needs analyses for M&MPC clients and helps them develop system specifications. He joined Marsh & McLennan's Client Information Services in 1983, where he was responsible for managing several client accounts utilizing CIS's mainframe and microcomputer services.

He is a core member of Marsh & McLennan's RMIS (Risk Management Information Systems) network. The members of this network provide consulting and advisory services to assist Marsh & McLennan clients in the RMIS evaluation, selection and education process.

He also oversees the Local Area Network located in the Technical Development Center, which is the hub of M&MPC Communications Network. He designed and produced the M&MPC Mail System, the M&MPC Roster System and the M&MPC On-Line Publication Ordering System plus other internal systems.

Mr. Dean is a member of the Data Processing Management Association and has received the Certified Data Processor (CDP) certification through the Institute for Certification of Computer Professionals (ICCP). He is a graduate of Eastern Illinois University with a Bachelor of Science degree in Business. He completed DePaul University's Computer Career Program, receiving a Certificate of Completion with Distinction. He has also received a Master's degree in Computer Science with Distinction from DePaul University, where he has taught graduate and undergraduate computer-related courses in the School of Business.

APPENDIX B

Gulf Power Company Acceptance Letter
dated January 26, 1996

Post Office Box 1151
Pensacola FL 32520-0103
Telephone 904 444-6384

Ronnie R. Labrato
Controller

January 26, 1996

the southern electric system

Mr. Leonard R. Hathaway
Senior Vice President
M & M Protection Consultants
3400 Georgia-Pacific Center
133 Peachtree St., N.E.
P. O. Box 105008
Atlanta, GA 30348-5008

Dear Mr. Hathaway:

SUBJECT: Transmission and Distribution System
Hurricane Study

Gulf Power Company accepts your proposal dated January 17, 1996, to provide a hurricane impact analysis of Gulf Power Company's transmission and distribution system. You are authorized to proceed with the study. Bill Pugh, Manager of Plant and Materials Accounting, will be your contact person at Gulf Power to provide you the data you need for the study and answer any questions. You can reach him at (904) 444-6318.

Thank you for your prompt response to our request. We look forward to working with you on the study.

Sincerely,

Ronnie Labrato

RRL:lj

cc: Arlan E. Scarbrough
Jack L. Haskins
Robert G. Livingston
William A. Pugh
Gregg Meggs, Southern Company Services

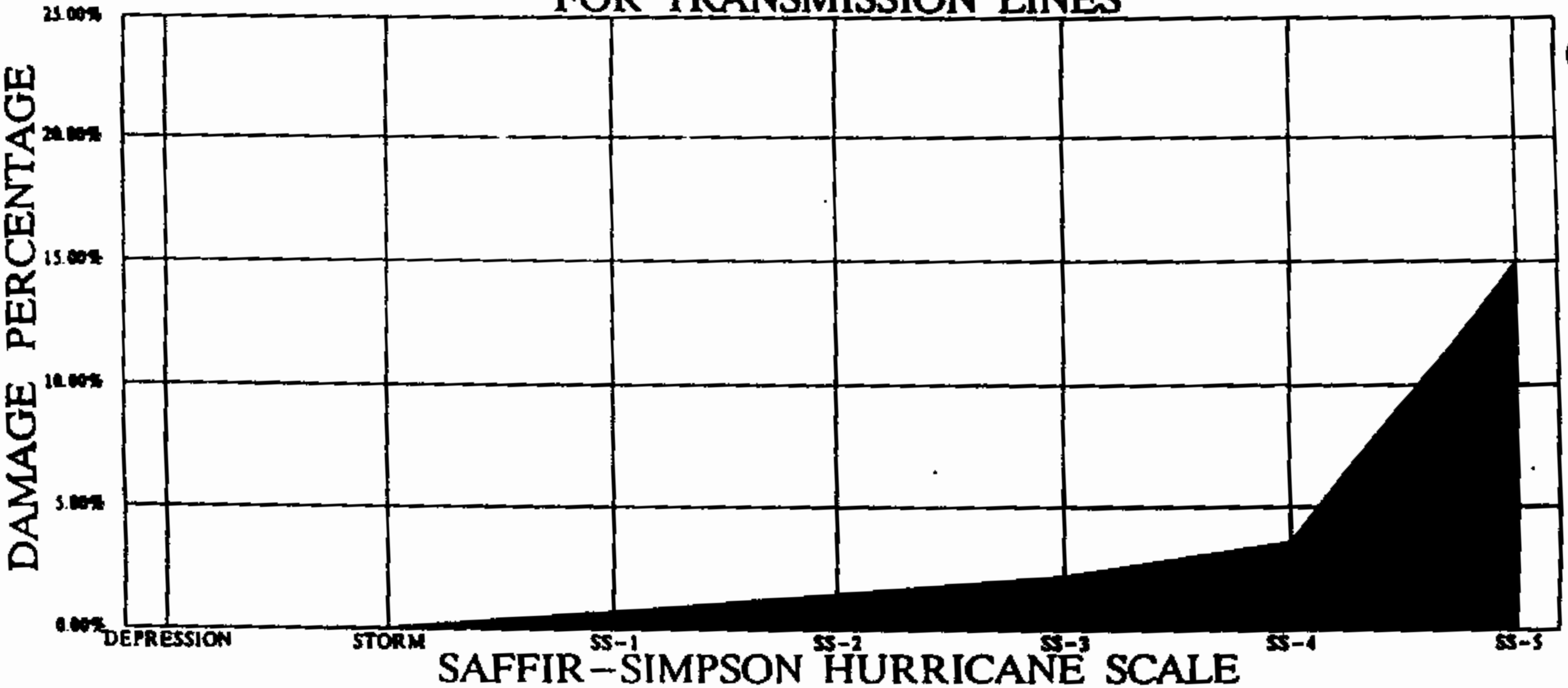
APPENDIX C

Mean Damage Profiles for Transmission and Distribution (T&D)

Appendix C.

MEAN DAMAGE PROFILE

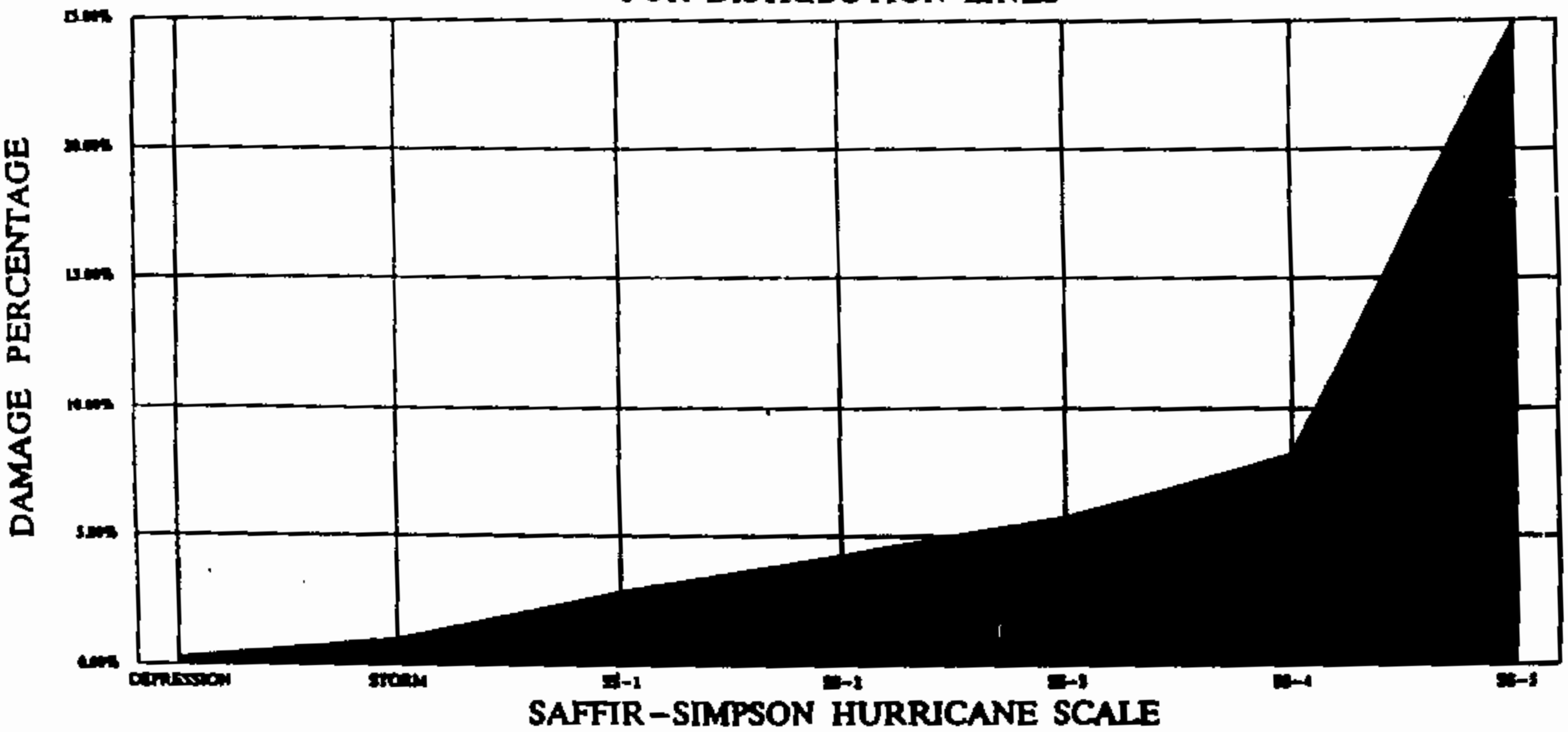
FOR TRANSMISSION LINES



03-Apr-94

MEAN DAMAGE PROFILE

FOR DISTRIBUTION LINES



APPENDIX D

Hurricane Effects

NATURAL HAZARD EXPOSURE ASSESSMENT
SITE IMPACT REPORT

CLIENT:

LOCATION:

H U R R I C A N E

100 YEAR FREQUENCY/IMPACT DISTRIBUTION

100 YEAR OCCURRENCE FREQUENCY	SAFFIR SIMPSON INTENSITY SCALE	WIND TYPE	WIND SPEED (MPH)	SEVERITY FACTOR	SAFFIR/SIMPSON SCALE EFFECTS DESCRIPTION
0.86	-	DEPRESSION	32-38	0.25	- -
0.86	-	STORM	39-73	1.00	- -
0.00	SS-1	HURRICANE (MINIMAL)	74-95	2.30	DAMAGE PRIMARILY TO SHRUBBERY, TREES, FOLIAGE, AND UNANCHORED MOBILE HOMES. NO REAL DAMAGE TO OTHER STRUCTURES. SOME DAMAGE TO POORLY CONSTRUCTED SIGNS. STORM SURGE 4 TO 5 FEET ABOVE NORMAL. LOW LYING COASTAL ROADS INUNDATED, MINOR PIER DAMAGE, SOME SMALL CRAFT TORN FROM MOORINGS IN EXPOSED ANCHORAGE.
0.00	SS-2	HURRICANE (MODERATE)	96-110	3.40	CONSIDERABLE DAMAGE TO SHRUBBERY AND TREE FOLIAGE; SOME TREES BLOWN DOWN. MAJOR DAMAGE TO EXPOSED MOBILE HOMES. EXTENSIVE DAMAGE TO POORLY CONSTRUCTED SIGNS. SOME DAMAGE TO ROOFING MATERIALS OF BUILDINGS; SOME WINDOW AND DOOR DAMAGE. NO MAJOR DAMAGE TO BUILDINGS. STORM SURGE 6 TO 8 FEET ABOVE NORMAL. COASTAL ROADS AND LOW LYING ESCAPE ROUTES INLAND CUT BY RISING WATER 2 TO 4 HOURS BEFORE ARRIVAL OF HURRICANE CENTER. CONSIDERABLE DAMAGE TO PIERS; MARINAS FLOODED. SMALL CRAFT TORN FROM MOORINGS IN UNPROTECTED ANCHORAGES. EVACUATION OF SOME SHORELINE RESIDENCES AND LOW LYING ISLAND AREAS REQUIRED.
0.00	SS-3	HURRICANE (EXTENSIVE)	111-130	4.60	FOLIAGE TORN FROM TREES; LARGE TREES BLOWN DOWN. SOME DAMAGE TO ROOFING MATERIALS OF BUILDINGS, SOME WINDOW. AND DOOR DAMAGE. SOME STRUCTURAL DAMAGE TO SMALL BUILDINGS. MOBILE HOMES DESTROYED. STORM SURGE 9 TO 12 FEET ABOVE NORMAL. SERIOUS FLOODING AT COAST; MANY SMALLER STRUCTURES NEAR COAST DESTROYED; LARGER STRUCTURES NEAR COAST DAMAGED BY BATTERING WAVES AND FLOATING DEBRIS. LOW LYING ESCAPE ROUTES INLAND CUT BY RISING WATER 3 TO 5 HOURS BEFORE HURRICANE CENTER ARRIVES. FLAT TERRAIN 5 FEET OR LESS ABOVE SEA LEVEL FLOODED INLAND 8 MILES OR MORE. EVACUATION OF LOW LYING RESIDENCES WITHIN SEVERAL BLOCKS OF SHORELINE POSSIBLY REQUIRED.
0.00	SS-4	HURRICANE (EXTREME)	131-155	6.30	SHRUBS AND TREES BLOWN DOWN; ALL SIGNS DOWN. EXTENSIVE DAMAGE TO ROOFING MATERIALS, WINDOWS, AND DOORS. COMPLETE FAILURE OF ROOFS ON MANY SMALL RESIDENCES. STORM SURGE 13 TO 18 FEET ABOVE NORMAL. FLAT TERRAIN 10 FEET OR LESS ABOVE SEA LEVEL FLOODED INLAND AS FAR AS 6 MILES. MAJOR DAMAGE TO LOWER FLOORS OF STRUCTURES NEAR SHORE DUE TO FLOODING AND BATTERING BY WAVES AND FLOATING DEBRIS. MAJOR EROSION OF BEACHES. MASSIVE EVACUATION OF ALL RESIDENCES WITHIN 500 YARDS OF SHORE POSSIBLY REQUIRED, AND EVACUATION OF SINGLE STORY RESIDENCES ON LOW GROUND WITHIN 2 MILES OF SHORE REQUIRED.

NATURAL HAZARD EXPOSURE ASSESSMENT
SITE IMPACT REPORT

CLIENT:

H U R R I C A N E

LOCATION:

100 YEAR FREQUENCY/IMPACT DISTRIBUTION

100 YEAR OCCURRENCE FREQUENCY	SAFFIR SIMPSON INTENSITY SCALE	WIND TYPE	WIND SPEED (MPH)	SEVERITY FACTOR	SAFFIR/SIMPSON SCALE EFFECTS DESCRIPTION
0.00	SS-5	HURRICANE (CATASTROPHIC)	155+	8.70	CONSIDERABLE DAMAGE TO ROOFS OF BUILDINGS. VERY SEVERE AND EXTENSIVE DAMAGE TO WINDOWS AND DOORS. COMPLETE FAILURE OF ROOFS ON MANY RESIDENCES AND INDUSTRIAL BUILDINGS; EXTENSIVE SHATTERING OF GLASS IN WINDOWS AND DOORS. SOME COMPLETE BUILDING FAILURES. SMALL BUILDINGS OVERTURNED OR BLOWN AWAY. STORM SURGE GREATER THAN 18 FEET ABOVE NORMAL. MAJOR DAMAGE TO LOWER FLOORS OF ALL STRUCTURES LESS THAN 15 FEET ABOVE SEA LEVEL WITHIN 500 YARDS OF SHORE. EVACUATION OF RESIDENTIAL AREAS ON LOW GROUND WITHIN 5 TO 10 MILES OF SHORE POSSIBLY REQUIRED.

1.72 (TOTAL)

HURRICANE EXPOSURE RATING = 1.08

APPENDIX E

The Ten Most Costly Insured Catastrophes, United States

Appendix E
The Ten Most Costly Insured Catastrophes, US

Month/Year	Perils	Insured Loss
August, 1992	Hurricane Andrew	$15,500,000,000
January, 1994	Northridge, California earthquake	$12,500,000,000
September, 1989	Hurricane Hugo	$4,195,000,000
October, 1995	Hurricane Opal	$2,100,000,000
March, 1993	20-State Winter Storm	$1,750,000,000
October, 1991	Oakland, California fire	$1,700,000,000
September, 1992	Hurricane Iniki, Hawaii	$1,600,000,000
May, 1995	Wind, hail, flooding - Texas & New Mexico	$1,135,000,000
October, 1989	Loma Prieta, California earthquake	$960,000,000
October/November, 1993	California brush fires	$950,000,000

Insurance Issues Update, February 1996

TABLES

Table 1

GULF POWER COMPANY
HURRICANE STUDY
T&D REPLACEMENT COSTS BY COUNTY

County	TransMiles	Total Value ($)`	DistMiles	Total Value ($)
Bay	310	46,810,000	1151	111,647,000
Calhoun	97	14,647,000	0	0
Escambia	227	34,277,000	2371	229,987,000
Gadsden	11	1,661,000	0	0
Holmes	72	10,872,000	37	3,589,000
Jackson	130	19,630,000	23	2,231,000
Okaloosa	270	40,770,000	1,113	107,961,000
Santa Rosa	241	36,391,000	465	45,105,000
Walton	121	18,271,000	56	5,432,000
Washington	65	9,815,000	88	8,536,000
TOTALS	1544	233,144,000	5,304	514,488,000

Table 2

Number of Hurricanes (Direct Hits) Affecting U.S. and Individual States 1899-1992 According to Saffir-Simpson Hurricane Scale

	Category Number						Major Hurricane
	1	2	3	4	5		(23)
U.S. (Texas to Maine)	59	34	45	15	2	155	62
Texas (TX)	12	9	9	6	0	36	15
North	7	3	3	4	0	17	7
Central	2	2	1	1	0	6	2
South	3	4	5	1	0	13	6
Louisiana (LA)	8	5	8	3	1	25	12
Mississippi (MS)	1	1	5	0	1	8	6
Alabama (AL)	4	1	5	0	0	10	5
Florida (FL)	17	15	16	6	1	55	23
Northwest	9	7	6	0	0	22	6
Northeast	1	7	0	0	0	8	0
Southwest	6	3	6	2	1	18	9
Southeast	4	10	7	4	0	25	11
Georgia (GA)	1	4	0	0	0	5	0
South Carolina (SC)	7	4	2	2	0	15	4
North Carolina (NC)	11	3	9	1	0	24	9
Virginia (VA)	2	1	1	0	0	4	1
Maryland (MD)	0	1	0	0	0	1	0
Delaware (DE)	0	0	0	0	0	0	0
New Jersey (NJ)	1	0	0	0	0	1	0
New York (NY)	3	1	5	0	0	9	5
Connecticut (CT)	2	3	3	0	0	8	3
Rhode Island (RI)	0	2	3	0	0	5	3
Massachusetts (MA)	2	2	2	0	0	6	2
New Hampshire (NH)	1	1	0	0	0	2	0
Maine (ME)	5	0	0	0	0	5	0

Source: *"Tropical Cyclones of the North Atlantic Ocean, 1871-1992," National Climatic Data Center, Asheville, NC. November, 1993, page 33*

Table 3

GPC SERVICE TERRITORY
HISTORIC HURRICANE EVENTS; 1875-1995

Storm*	Year	Total Cost	Trended**
Unnamed	1886	—	—
Unnamed	1887	—	—
Unnamed	1889	—	—
Unnamed	1896	—	—
Unnamed	1903	—	—
Unnamed	1911	—	—
Unnamed	1915	—	—
Unnamed	1916	—	—
Unnamed	1917	—	—
Unnamed	1924	—	—
Unnamed	1929	—	—
Unnamed	1936	—	—
Unnamed	1939	—	—
Unnamed	1941	—	—
Florence	1953	—	—
Flossy	1956	—	—
Dora	1964	—	—
Hilda	1964	—	—
Camille	1969	$142,000	$368,000
Agnes	1972	—	--
Eloise	1975	$1,432,000	$1,905,000
Frederic	1979	$2,064,000	$3,715,000
Elena	1985	$2,918,000	$3,793,000
Juan	1985	$198,000	$257,000
Kate	1985	$930,000	$1,207,000
Erin	1995	$14,306,000	$14,306,000
Opal	1995	$11,678,000	$11,678,000

** Hurricanes were first named in 1950 using the phonetic alphabet. In 1953, women's names were used. In 1979, men's names were added. Storms are named after they reach wind speeds of 39 mph.*

*** Trended to Handy-Whitman Index*

Table 4

Maximum Historical Event (#42, 1889)

All Counties For Service Territory

90% Probability of Non-Exceedance **Table 4**

LOCATION	PEAK GUST AT SITE (MPH)	Reported Trans. Values	Reported Dist. Values	Projected Trans. Mean Loss	Projected Dist. Mean Loss	Projected Aggregrate Mean Loss
BAY	58	$46,809,998	$111,646,998	$10,860	$1,025,292	$1,036,152
CALHOUN	55	$14,646,999	$0	$3,398	$0	$3,398
ESCAMBIA	116	$34,276,999	$229,986,999	$589,130	$12,783,444	$13,372,574
GADSDEN	0	$1,660,999	$0	$0	$0	$0
HOLMES	96	$10,872,000	$3,589,001	$109,615	$148,315	$257,931
JACKSON	79	$19,630,000	$2,231,002	$69,830	$62,003	$131,834
OKALOOSA	116	$40,770,000	$107,960,999	$700,728	$6,000,832	$6,701,560
SANTA ROSA	120	$36,391,001	$45,105,000	$625,464	$2,507,086	$3,132,551
WALTON	105	$18,271,001	$5,432,000	$184,214	$224,477	$408,692
WASHINGTON	69	$9,815,001	$8,536,000	$2,277	$78,389	$80,666
$747,600,000		$233,100,000	$514,500,000	$2,296.000	$22,830,000	$25,100,000
100.00%		31.18%	68.82%	0.31%	3.05%	3.36%

Table 5

Maximum Stochastic Event (#1620)

All Counties For Service Territory

90% Probability of Non-Exceedance

Table 5

LOCATION	PEAK GUST AT SITE (MPH)	Reported Trans. Values	Reported Dist. Values	Projected Trans. Mean Loss	Projected Dist. Mean Loss	Projected Aggregrate Mean Loss
BAY	0	$46,809,998	$111,646,998	$0	$18,671	$18,671
CALHOUN	0	$14,646,999	$0	$0	$0	$0
ESCAMBIA	167	$34,276,999	$229,986,999	$2,733,591	$55,580,191	$58,313,782
GADSDEN	0	$1,660,999	$0	$0	$0	$0
HOLMES	159	$10,872,000	$3,589,001	$867,042	$867,342	$1,734,384
JACKSON	122	$19,630,000	$2,231,002	$337,387	$124,007	$461,394
OKALOOSA	180	$40,770,000	$107,960,999	$3,251,408	$26,090,575	$29,341,982
SANTA ROSA	176	$36,391,001	$45,105,000	$2,902,182	$10,900,375	$13,802,557
WALTON	168	$18,271,001	$5,432,000	$1,457,112	$1,312,733	$2,769,846
WASHINGTON	104	$9,815,001	$8,536,000	$98,958	$352,750	$451,708
$747,600,000		$233,100,000	$514,500,000	$11,648,000	$95,247,000	$106,900,000
100.00%		31.18%	68.82%	1.56%	12.74%	14.30%

05/06/98

Table : 6

Cumulative Probability Of Achieving
The Projected Loss Level Within The Time Window

90% Probability of Non-Exceedance

PROJECTED LOSS LEVEL	1 YEARS	5 YEARS	10 YEARS	25 YEARS	50 YEARS	75 YEARS	100 YEARS	150 YEARS	200 YEARS	300 YEARS	400 YEARS	500 YEARS
$1,000,000	16.28%	81.41%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%
$2,000,000	12.32%	61.60%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%
$3,000,000	9.00%	44.99%	89.97%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%
$4,000,000	7.17%	35.83%	71.67%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%
$5,000,000	6.14%	30.69%	61.39%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%
$6,000,000	5.00%	24.99%	49.98%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%
$7,000,000	4.50%	22.51%	45.01%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%
$8,000,000	4.30%	21.50%	42.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%
$9,000,000	3.91%	19.56%	39.13%	97.81%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%
$10,000,000	3.65%	18.23%	36.47%	91.17%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%
$20,000,000	2.01%	10.06%	20.12%	50.30%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%
$30,000,000	1.01%	5.07%	10.15%	25.37%	50.75%	76.12%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%
$40,000,000	0.38%	1.88%	3.77%	9.42%	18.85%	28.27%	37.70%	56.55%	75.39%	99.99%	99.99%	99.99%
$50,000,000	0.19%	0.93%	1.86%	4.64%	9.29%	13.93%	18.57%	27.86%	37.15%	55.72%	74.30%	92.87%
$60,000,000	0.07%	0.36%	0.73%	1.81%	3.63%	5.44%	7.26%	10.89%	14.52%	21.77%	29.03%	36.29%
$70,000,000	0.03%	0.14%	0.28%	0.69%	1.38%	2.07%	2.76%	4.14%	5.52%	8.28%	11.04%	13.80%
$80,000,000	0.01%	0.04%	0.08%	0.19%	0.39%	0.58%	0.77%	1.16%	1.55%	2.32%	3.10%	3.87%
$90,000,000	0.00%	0.01%	0.01%	0.03%	0.06%	0.09%	0.12%	0.18%	0.24%	0.36%	0.48%	0.60%
$100,000,000	0.001%	0.004%	0.008%	0.021%	0.042%	0.064%	0.085%	0.127%	0.169%	0.254%	0.339%	0.424%
$110,000,000	0.0006%	0.003%	0.006%	0.015%	0.029%	0.044%	0.058%	0.088%	0.117%	0.175%	0.233%	0.292%

FIGURES

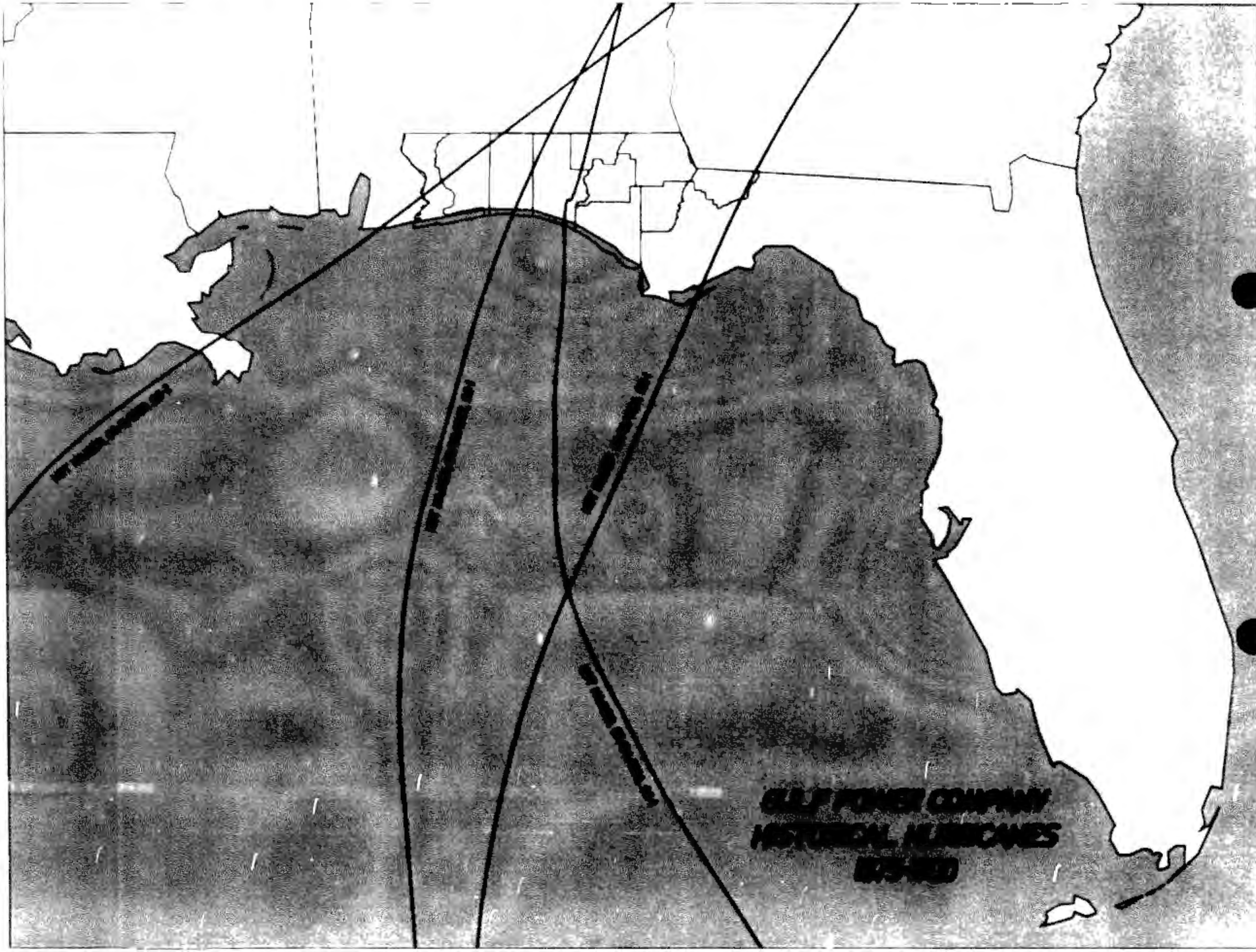


Figure 1

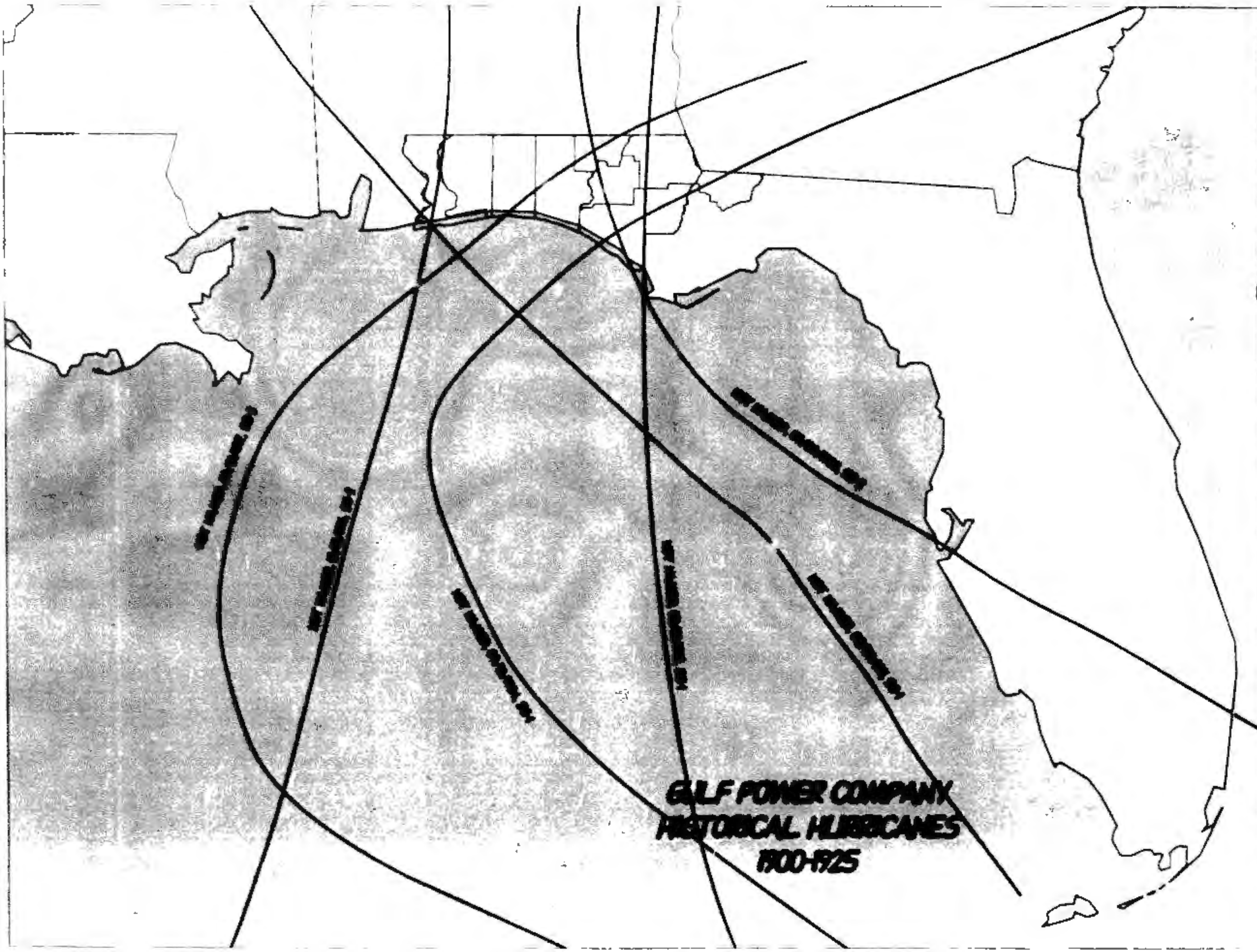


Figure 2

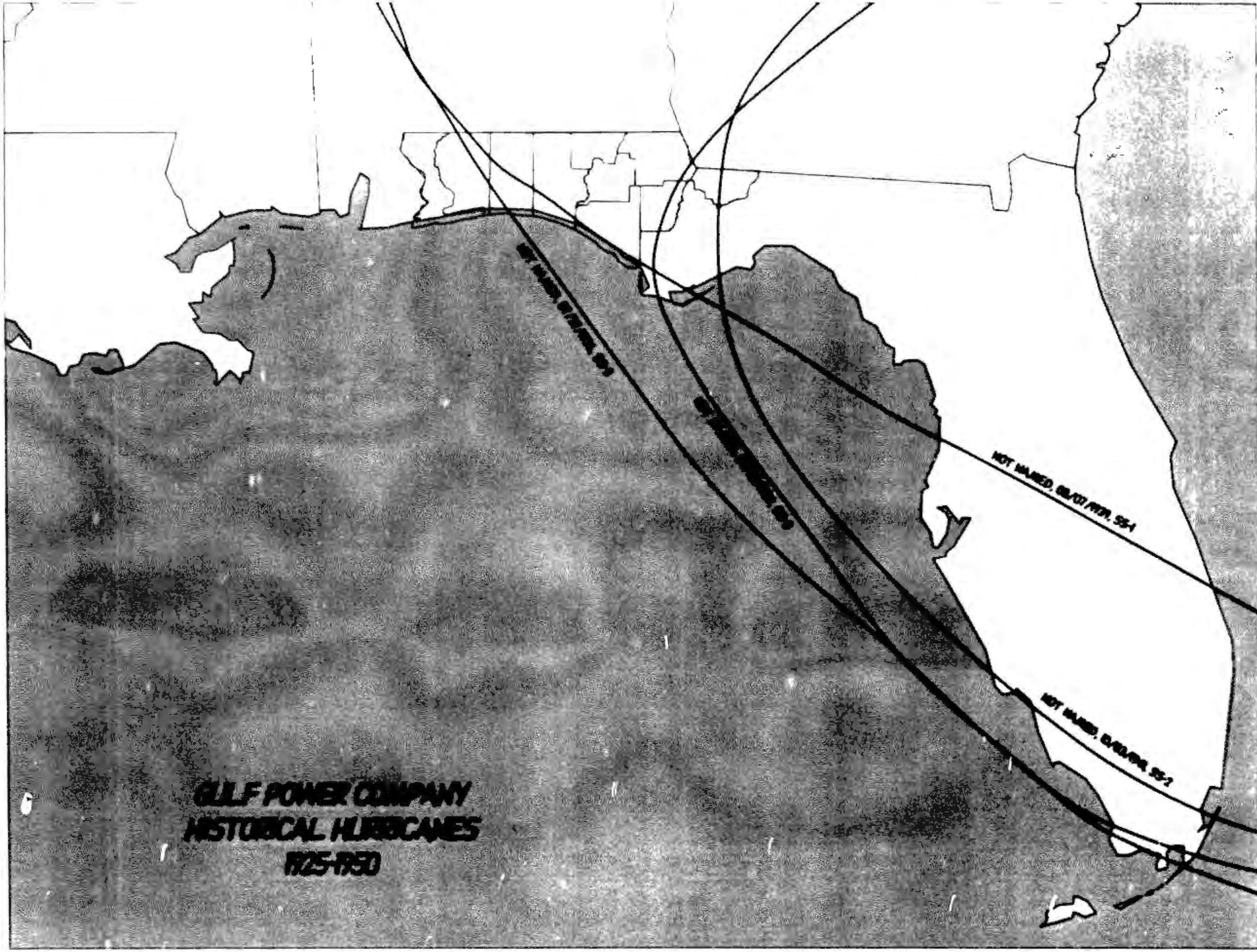


Figure 3

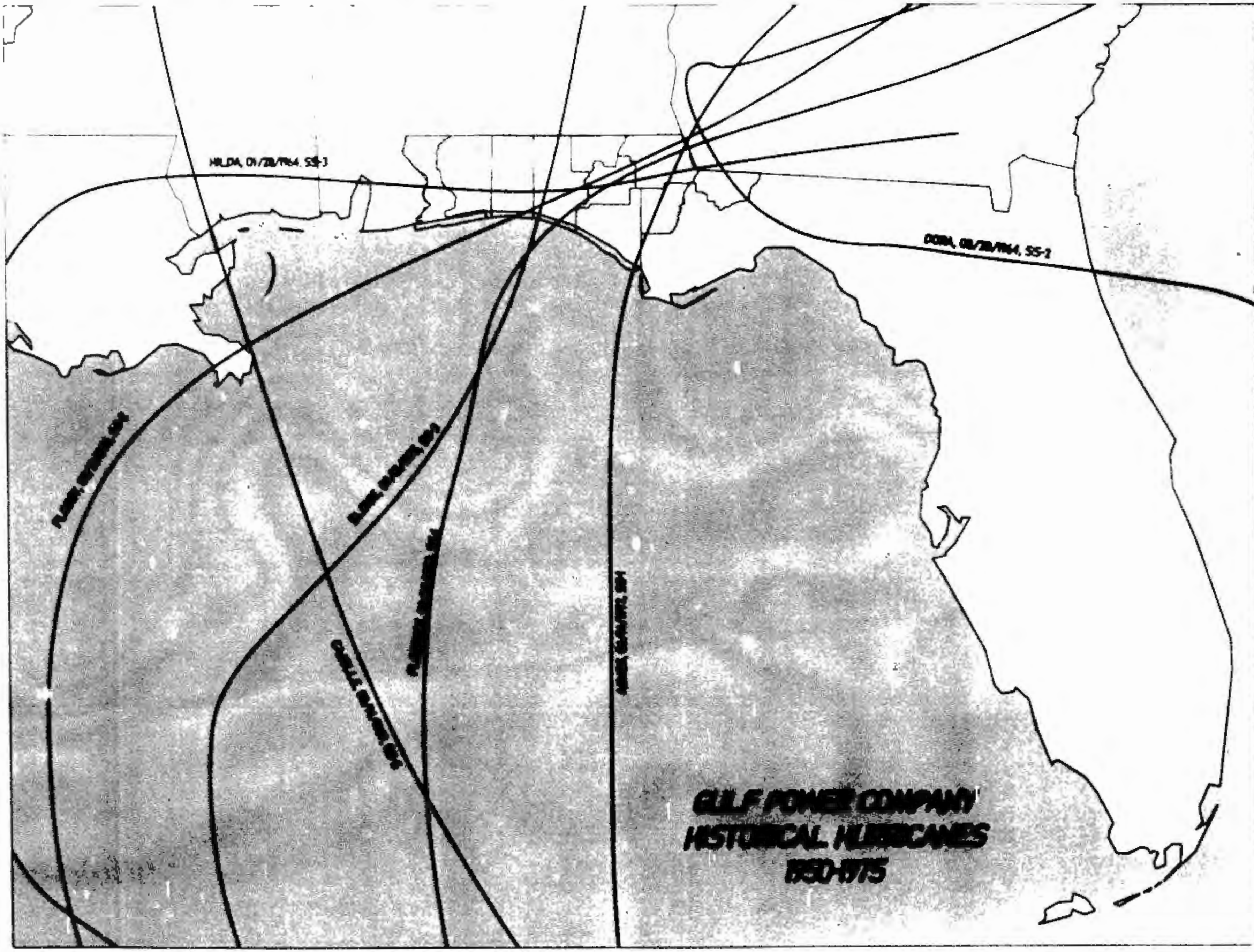

GULF POWER COMPANY
HISTORICAL HURRICANES
1950-1975
HILDA, 01/28/1964, SS-3
DORA, 08/28/1964, SS-2

Figure 4

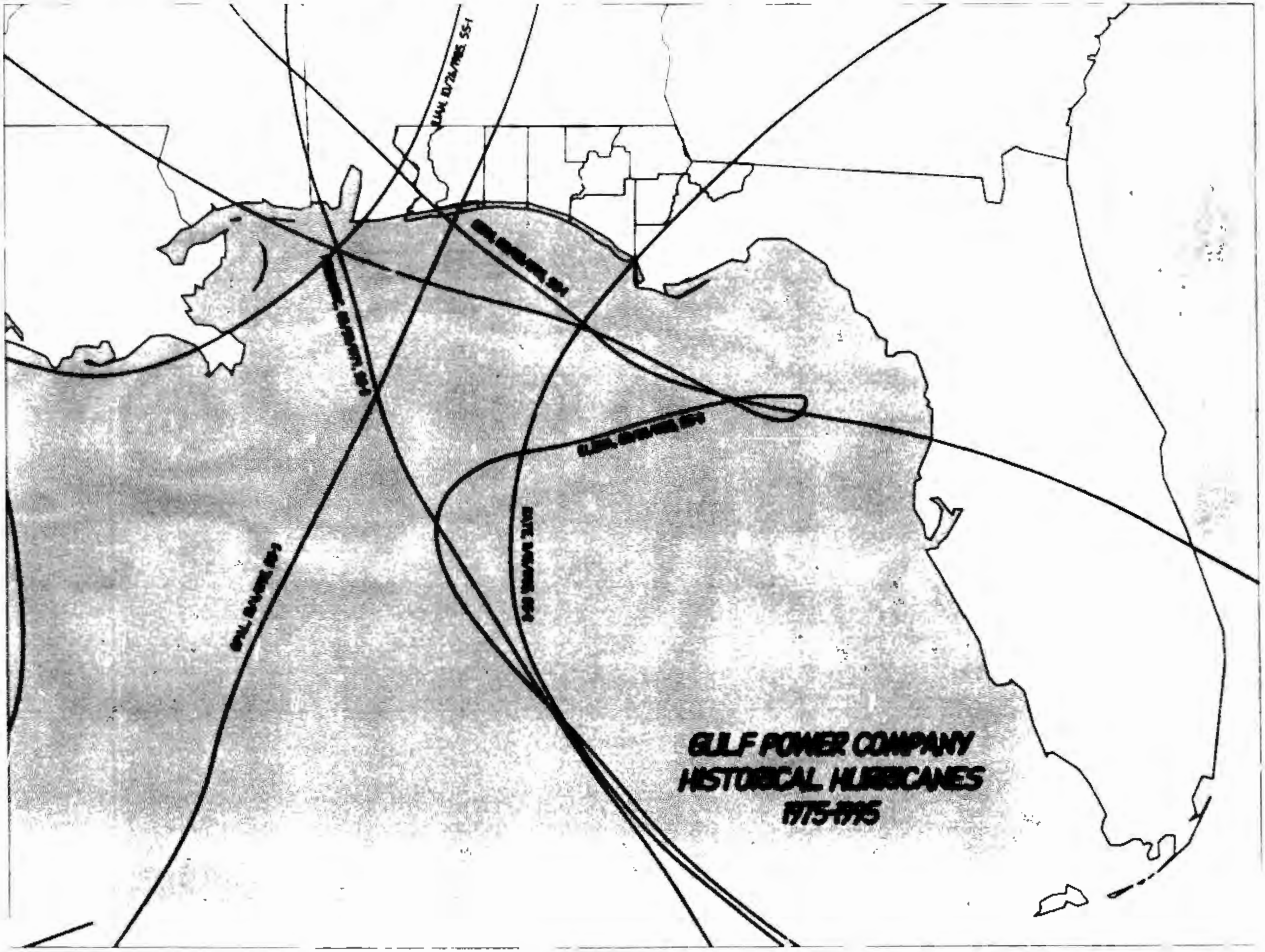


Figure 5

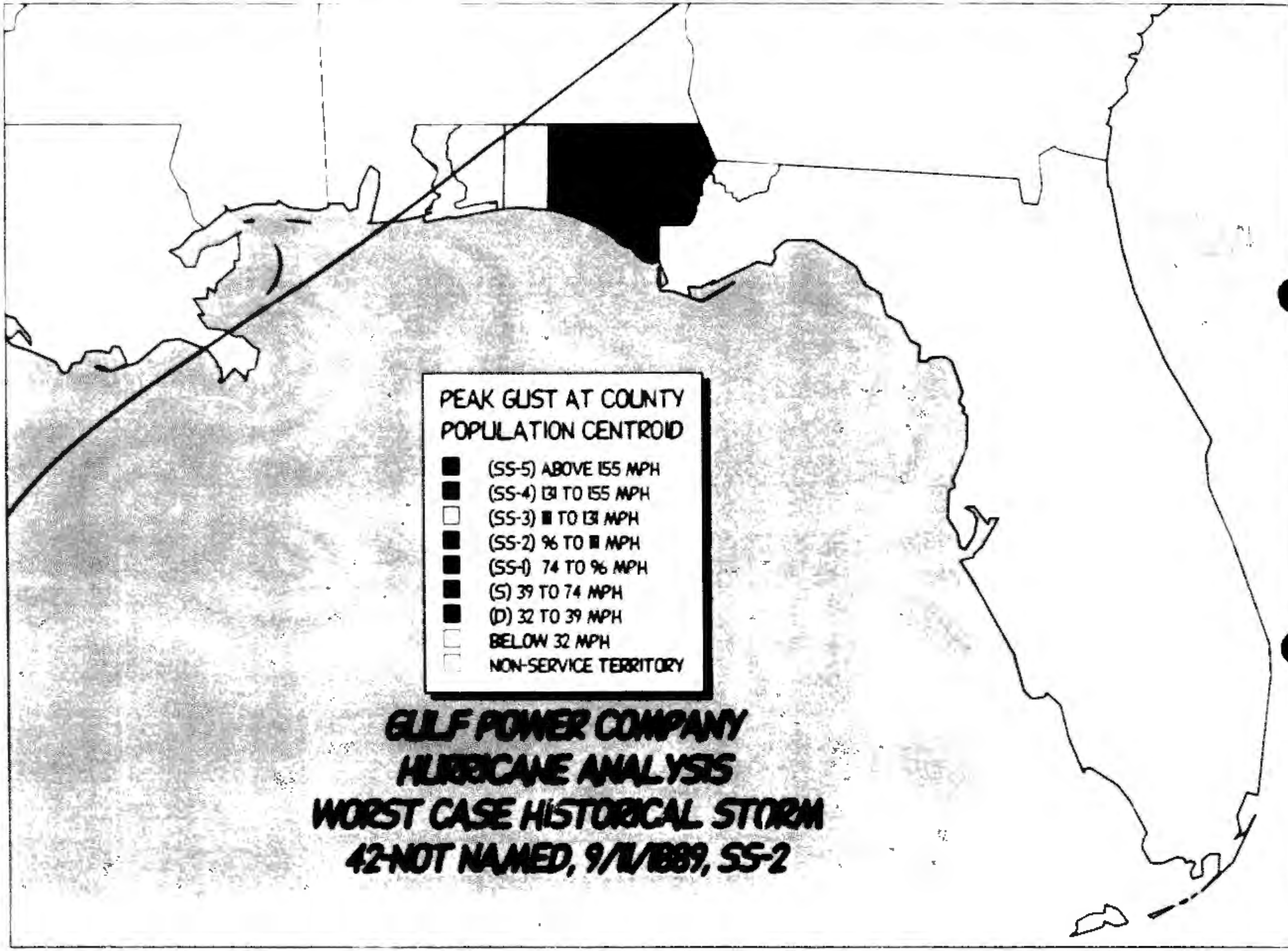
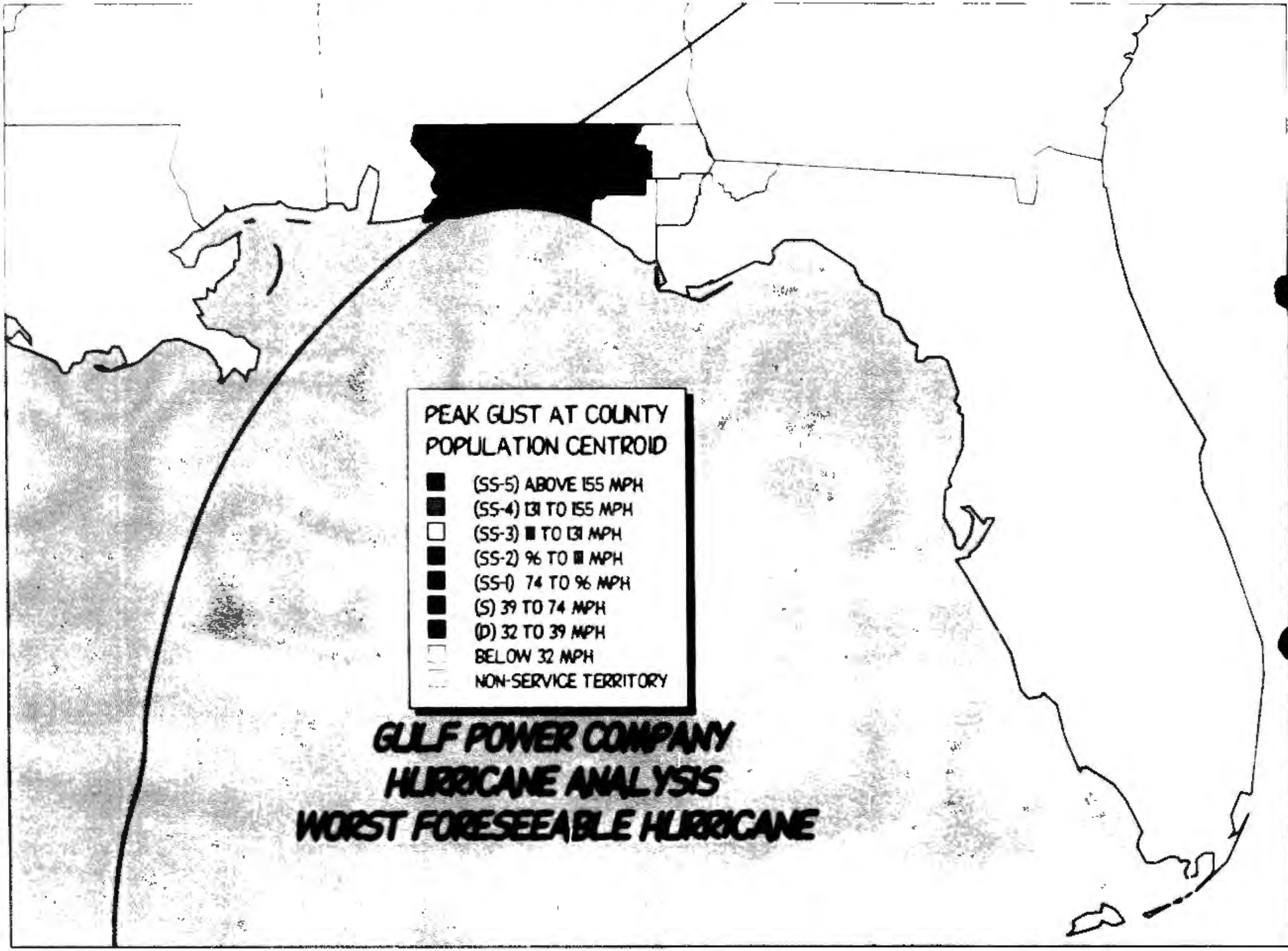

PEAK GUST AT COUNTY
POPULATION CENTROID
(SS-5) ABOVE 155 MPH
(SS-4) 131 TO 155 MPH
(SS-3) TO 131 MPH
(SS-2) 96 TO MPH
(SS-1) 74 TO 96 MPH
(S) 39 TO 74 MPH
(D) 32 TO 39 MPH
BELOW 32 MPH
NON-SERVICE TERRITORY
GULF POWER COMPANY
HURRICANE ANALYSIS
WORST CASE HISTORICAL STORM
42-NOT NAMED, 9/11/1889, SS-2

Figure 6



PEAK GUST AT COUNTY
POPULATION CENTROID
(SS-5) ABOVE 155 MPH
(SS-4) 131 TO 155 MPH
(SS-3) TO 131 MPH
(SS-2) 96 TO MPH
(SS-1) 74 TO 96 MPH
(S) 39 TO 74 MPH
(D) 32 TO 39 MPH
BELOW 32 MPH
NON-SERVICE TERRITORY
GULF POWER COMPANY
HURRICANE ANALYSIS
WORST FORESEEABLE HURRICANE

Figure 7