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Gulf's Response to OPC's Fifth Set of Interrogatories Nos. 50, 53, 55-56, 60-65 (Docket No. 20200241-EI)

QUESTION:
Please identify all other computer simulation and/or management tools besides the Storm Damage Model utilized by the Company to forecast storm damage result information, to forecast construction man hours ("CMH"), and to forecast resource requirements.

RESPONSE:
The Storm Damage Model is the only computer simulation tool used to forecast damage and CMH. The CMH output from the Storm Damage Model is used by the Company, along with other information, to forecast resource requirements. Resource requirements are not forecasted by a simulation or management tool. Resource requirements are determined based on multiple factors, which include forecast damage from the Storm Damage Model, resource availability and location, historical performance comparisons for similar events, and the experience and expertise of FPL's management team.

QUESTION:
Please describe the concept of "failure mechanisms," each of the failure mechanisms that are considered and modeled, and how each mechanism is incorporated in the Storm Damage Model and each of the related models in the software itself and/or the inputs to the models, and then in the operation of each model in the storm preparation process prior to landfall.

RESPONSE:
Failure mechanisms are different types of damages to the electric infrastructure potentially caused during storms that contribute to calculations of projected CMH. Failure mechanisms are included within the storm damage physics-based model that is used for forecasting CMH and are comprised of four types as detailed below. As detailed in page 2 of the "Storm Damage Model" document included in FPL's response to OPC's Second Request for Production of Documents No. 18, these failure mechanisms include:

- Contact with vegetation that causes electrical and minor structural damage based on:
  - Gust wind speed
  - Vegetation density
  - Maintenance date
  - Storm date

- Tree blow down inside and outside of the normal line clearing zone based on:
  - Gust wind speed
  - Tree type and height
  - De-leafing and tree loss from previous events
  - The duration of winds greater than 39 mph

- Wind load on a pole based on:
  - Gust wind speed
  - Pole design including conductor size and height, pole class and shape
  - Inspection data including ground line circumference and remaining strength
  - Wind borne debris from nearby damaged structures that impact or add loading to the pole
  - Soil conditions and the duration of winds greater than 39 mph in so far as leaning

- Storm surge flooding based on:
  - NOAA SLOSH model data
  - Equipment elevation and National Flood Insurance Program velocity zones

QUESTION:
Please describe the team(s) of Company employees and/or contractor employees that develop and maintain the Company's Storm Damage Model and each of related models, including the software itself, annual updates for changes in the asset inventory and vegetation data, among other updates unrelated to actual storm preparation. Provide a list of each Company employee position and/or contractor position and the responsibilities for each position. Indicate if the position is full-time or part-time.

RESPONSE:
The employee positions that develop, maintain, and operate the Storm Damage Model include Emergency Preparedness Product Owner, Meteorologist, and IT programmer. Other supporting individuals contribute to the team's work as required (including any additional data scientist and IT support). These individuals work to develop, maintain, and operate the Storm Damage Model on a part time basis as a part of their storm roles, in addition to their various other responsibilities within the Company. The table below includes the employee positions and their responsibilities relevant to the Storm Damage model.

Employee Position	**Responsibility**
Emergency Preparedness Product Owner	Analyze and summarize the results and disseminate the outputs from the Storm Damage Model
Meteorologist	Provide the meteorological forecast and analyze the meteorological aspects of the outputs
IT programmer	Input model data.

QUESTION:
Please describe the team(s) of Company employees and/or contractor employees that operate the Company's Storm Damage Model and each of the related models related to storm preparation prior to landfall and after landfall, if they are updated at all after landfall. Provide a list of each Company employee position and/or contractor position and the responsibilities for each position. Indicate if the position is full-time or part-time.

RESPONSE:
Please see FPL's response to OPC's Fifth Interrogatories No 55. The people in the positions identified in FPL's response to OPC's Fifth Interrogatories No. 55 also operate the Storm Damage Model. The team continually works to better calibrate and retrain the models during off hurricane season using the actual historical information.

QUESTION:
Please confirm that the forecasted CMH is not a direct output of the Storm Damage Model. If not confirmed, please explain.

RESPONSE:
FPL cannot confirm this statement. Forecasted CMH is in fact a direct output of the Storm Damage Model. The Storm Damage Model combines wind and in-service asset data to produce damage result information in terms of projected construction man-hours (CMH) that are required to repair forecasted damage.

QUESTION:
Please describe in detail the process used to determine forecast CMH based on the storm damage forecasts produced by the Storm Damage Model, including all use of electronic models or spreadsheets and all use of manual processes.

RESPONSE:
Please see FPL's response to OPC's Fifth Interrogatories Nos. 51-53 and 60. Forecast CMH is a direct output of the Storm Damage Model. The forecast CMH is calculated based on the forecast wind speeds and forecasted estimated damage to the in-service assets located in the affected area. The CMH is estimated at a regional management level and is associated with staging sites established in the affected management area.

QUESTION:
Please describe in detail the process used to determine resources required based on forecast CMH, including all use of electronic models or spreadsheets and all use of manual processes.

RESPONSE:
In addition to the CMH output derived from the Storm Damage Model, please see page 13 of Witness Spoor's direct testimony where he states "The workload projections are matched with resource factors such as availability and location, and Gulf's capacity to manage and support available resources efficiently and safely. As soon as the storm passes, employees are tasked with determining and assessing system damage. Gulf utilizes damage assessments obtained through aerial and field patrols and customer outage information contained in Gulf's outage management system."

QUESTION:
Please confirm that even though wind data from other modeling sources are utilized to inform decisions, the Company ultimately relies upon wind data models obtained from the NHC. If not confirmed, please explain.

RESPONSE:
Confirmed. FPL receives and utilizes derived wind data from European Centre for Medium Range Weather Forecasts and the US National Weather Service. These numerical weather prediction models are utilized by the National Hurricane Center to produce their official forecast, and the Company relies upon the National Hurricane Center official forecast as an input to the Storm Damage Model.

QUESTION:
Please indicate how many separate models from the NHC are normally available and relied upon by the Company in its Monte Carlo simulations.

RESPONSE:
There is only one official forecast from the National Hurricane Center, which is updated every six hours.

QUESTION:
Please identify the sources and numbers of the wind data models other than the NHC that may be utilized by the Company and describe the level of reliance upon each.

RESPONSE:
The source for the US GFS model is NOAA, including the one deterministic, one control, and twenty perturbed ensemble members. The source for the European model is ECMWF, including the one deterministic, one control, and fifty perturbed ensemble members. The total number of derived wind data used is up to seventy-four. However, we anchor on the National Hurricane Center forecast derived wind field to calculate the damage forecast for resource planning using the physics-based Storm Damage Model.