**Florida Commission on**

**Hurricane Loss Projection Methodology**

### Hurricane Model Identification

**Name of Hurricane Model:**

**Hurricane Model Version Identification:**

**Interim Hurricane Model Update Version Identification:**

**Hurricane Model Platform Name and Identifications:**

**Interim Data Update Designation:**

**Name of Modeling Organization:**

**Street Address:**

**City, State, ZIP Code:**

**Mailing Address, if different from above:**

**Contact Person:**

**Phone Number:**  **Fax Number:**

**E-mail Address:**

**Date:**

**Hurricane Model Submission Data**

The following input data have been provided to the modeling organization on the enclosed CD.

**Input Data**

| **Name** | **Description** |
| --- | --- |
| 2017FormM1.xlsx | Hurricanes used for historical frequencies in Form M-1, Annual Occurrence Rates |
| 2017FormM3.xlsx | Rmax and Radii format for Form M-3, Radius of Maximum Winds and Radii of Standard Wind Thresholds |
| FormS6Input17.xlsx | Input variables for Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis  |
| FormS6Input17Quantiles.xlsx | Corresponding quantiles for input variables for Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis |
| hlpm2012c.exe | 2012 FHCF personal and commercial residential zero deductible exposure data for Form S-2A, Examples of Hurricane Loss Exceedance Estimates (2012 FHCF Exposure Data), Form S-5, Average Annual Zero Deductible Statewide Hurricane Loss Costs – Historical versus Modeled, Form A-2A, Base Hurricane Storm Set Statewide Hurricane Losses (2012 FHCF Exposure Data), Form A-3A, 2004 Hurricane Season Losses (2012 FHCF Exposure Data), Form A-4A, Hurricane Output Ranges (2012 FHCF Exposure Data), and Form A-8A, Hurricane Probable Maximum Loss for Florida (2012 FHCF Exposure Data  |
| hlpm2017c.exe | 2017 FHCF personal and commercial residential zero deductible exposure data for Form S-2B, Examples of Hurricane Loss Exceedance Estimates (2017 FHCF Exposure Data), Form S-5, Average Annual Zero Deductible Statewide Hurricane Loss Costs – Historical versus Modeled, Form A-2B, Base Hurricane Storm Set Statewide Hurricane Losses (2017 FHCF Exposure Data), Form A-3B, 2004 Hurricane Season Losses (2017 FHCF Exposure Data), Form A-4B, Hurricane Output Ranges (2017 FHCF Exposure Data), and Form A-8B, Hurricane Probable Maximum Loss for Florida (2017 FHCF Exposure Data  |
| NotionalInput17.xlsx | Notional structures and location grids for Form S-2A, Examples of Hurricane Loss Exceedance Estimates (2012 FHCF Exposure Data), Form S-2B, Examples of Hurricane Loss Exceedance Estimates (2017 FHCF Exposure Data), Form A-1, Zero Deductible Personal Residential Hurricane Loss Costs by ZIP Code, Form A-6, Logical Relationship to Hurricane Risk (Trade Secret item), and Form A-7, Percentage Change in Logical Relationship to Hurricane Risk |
| **Name** | **Description** |
| FormV1Input17.xlsx | Windspeeds for 96 ZIP Codes and personal and commercial residential exposure data (construction type and ZIP Codes) for Form V-1, One Hypothetical Event |
| 2017FormA1.xlsx | Hurricane loss cost data format for Form A-1, Zero Deductible Personal Residential Hurricane Loss Costs by ZIP Code |
| 2017FormA4A.xlsx | Hurricane output ranges format for Form A-4A, Hurricane Output Ranges (2012 FHCF Exposure Data)  |
| 2017FormA4B.xlsx | Hurricane output ranges format for Form A-4B, Hurricane Output Ranges (2017 FHCF Exposure Data) |
| 2017FormA5.xlsx | Percentage change in average hurricane loss cost output range data format for Form A-5, Percentage Change in Hurricane Output Ranges |
| 2017FormA6.xlsx | Logical relationship to hurricane risk exhibits format for Form A-6, Logical Relationship to Hurricane Risk (Trade Secret item) |
| 2017FormA7.xlsx | Percentage change in logical relationship to hurricane risk exhibits format for Form A-7, Percentage Change in Logical Relationship to Hurricane Risk |

Output shall be provided in specified output files as listed below. XXX denotes the abbreviated name of the modeling organization.

**Output Data**

| **Name** | **Description** |
| --- | --- |
| XXX17FormM1.xlsx | Output data from Form M-1, Annual Occurrence Rates |
| XXX17FormM3.xlsx | Output data from Form M-3, Radius of Maximum Winds and Radii of Standard Wind Thresholds |
| XXX17Expected Hurricane Loss Cost.dat andXXX17Expected Hurricane Loss Cost.pdf | Aggregated hurricane loss cost output data from Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis |
| XXX17Hurricane Loss Cost Contour.dat andXXX17Hurricane Loss Cost Contour.pdf | Mean hurricane loss cost output data from Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis |
| XXX17SenAnal.dat and XXX17SenAnal.pdf | Hurricane loss cost output data for the sensitivity analysis portion of Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis |
| XXX17UncAnal.dat and XXX17UncAnal.pdf | Hurricane loss cost output data for the uncertainty analysis portion for CP, Rmax, VT, Shape Parameter, CF, FFP, Quantile of Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis |
| **Name** | **Description** |
| XXX17FormV2.xlsx | Output data from Form V-2, Hurricane Mitigation Measures and Secondary Characteristics, Range of Changes in Damage  |
| XXX17FormV4.xlsx | Output data from Form V-4, Percentage Change in Hurricane Mitigation Measures and Secondary Characteristics |
| XXX17FormV5.xlsx | Output data from Form V-5, Percentage Change in Hurricane Mitigation Measures and Secondary Characteristics, Mean Damage Ratios and Hurricane Loss Costs |
| XXX17FormA1.xlsx andXXX17FormA1.pdf | Underlying hurricane loss cost data from Form A-1, Zero Deductible Personal Residential Hurricane Loss Costs by ZIP Code |
| XXX17FormA2A.xlsx | Output data from Form A-2A, Base Hurricane Storm Set Statewide Hurricane Losses (2012 FHCF Exposure Data) |
| XXX17FormA2B.xlsx | Output data from Form A-2B, Base Hurricane Storm Set Statewide Hurricane Losses (2017 FHCF Exposure Data) |
| XXX17FormA3A.xlsx | Output data from Form A-3A, 2004 Hurricane Season Losses (2012 FHCF Exposure Data) |
| XXX17FormA3B.xlsx | Output data from Form A-3B, 2004 Hurricane Season Losses (2017 FHCF Exposure Data) |
| XXX17FormA4A.xlsx | Hurricane output range exhibits from Form A-4A, Hurricane Output Ranges (2012 FHCF Exposure Data) |
| XXX17FormA4B,xlsx | Hurricane output range exhibits from Form A-4B, Hurricane Output Ranges (2017 FHCF Exposure Data) |
| XXX1FormA5.xlsx | Output data from Form A-5, Percentage Change in Hurricane Output Ranges (2012 FHCF Exposure Data) |
| XXX17FormA7.xlsx | Output data from Form A-7, Percentage Change in Logical Relationship to Hurricane Risk |
| XXX17FormA8A.xlsx | Output data from Form A-8A, Hurricane Probable Maximum Loss for Florida (2012 FHCF Exposure Data) |
| XXX17FormA8B.xlsx | Output data from Form A-8B, Hurricane Probable Maximum Loss for Florida (2017 FHCF Exposure Data) |

The modeling organization shall run various scenario hurricane events through the hurricane model on the input exposure data. The referenced output forms shall be completed and hurricane loss files provided in ASCII, Excel, and PDF format as specified. The file names shall include the abbreviated name of the modeling organization, the hurricane standards year, and the form name. Revised files shall also include the revision date.

**Notional Set 1 – Deductible Sensitivity**



**Notional Set 2 – Policy Form Sensitivity**



**Notional Set 3 – Policy Form/Construction Sensitivity**



**Notional Set 4 – Coverage Sensitivity**



**Notional Set 5 – Building Code/Enforcement (Year Built) Sensitivity**



**Notional Set 6 – Building Strength Sensitivity**



**Notional Set 7 – Condo Unit Floor Sensitivity**



**Notional Set 8 – Number of Stories Sensitivity**



***Figure 1***

### Florida County Codes

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **County** | **County** |  | **County** | **County** |  | **County** | **County** |
| **Code** | **Name** |  | **Code** | **Name** |  | **Code** | **Name** |
|  |  |  |  |  |  |  |  |
| **001** |  Alachua |  | **049** |  Hardee |  | **093** |  Okeechobee |
| **003** |  Baker |  | **051** |  Hendry |  | **095** |  Orange |
| **005** |  Bay |  | **053** |  Hernando |  | **097** |  Osceola |
| **007** |  Bradford |  | **055** |  Highlands |  | **099** |  Palm Beach |
| **009** |  Brevard |  | **057** |  Hillsborough |  | **101** |  Pasco |
| **011** |  Broward |  | **059** |  Holmes |  | **103** |  Pinellas |
| **013** |  Calhoun |  | **061** |  Indian River |  | **105** |  Polk |
| **015** |  Charlotte |  | **063** |  Jackson |  | **107** |  Putnam |
| **017** |  Citrus |  | **065** |  Jefferson |  | **109** |  St. Johns |
| **019** |  Clay |  | **067** |  Lafayette |  | **111** |  St. Lucie |
| **021** |  Collier |  | **069** |  Lake |  | **113** |  Santa Rosa |
| **023** |  Columbia |  | **071** |  Lee |  | **115** |  Sarasota |
| **027** |  De Soto |  | **073** |  Leon |  | **117** |  Seminole |
| **029** |  Dixie |  | **075** |  Levy |  | **119** |  Sumter |
| **031** |  Duval |  | **077** |  Liberty |  | **121** |  Suwannee |
| **033** |  Escambia |  | **079** |  Madison |  | **123** |  Taylor |
| **035** |  Flagler |  | **081** |  Manatee |  | **125** |  Union |
| **037** |  Franklin |  | **083** |  Marion |  | **127** |  Volusia |
| **039** |  Gadsden |  | **085** |  Martin |  | **129** |  Wakulla |
| **041** |  Gilchrist |  | **086** |  Miami-Dade |  | **131** |  Walton |
| **043** |  Glades |  | **087** |  Monroe |  | **133** |  Washington |
| **045** |  Gulf |  | **089** |  Nassau |  |  |  |
| **047** |  Hamilton |  | **091** |  Okaloosa |  |  |  |

**Note**: These codes are derived from the Federal Information Processing Standards (FIPS) Codes.

***Figure 2***

State of Florida

**By County**

**Comparison of 2017 Standards to 2015 Standards**

| **Standard** | **Title** | **Comments** |
| --- | --- | --- |
|  |  |  |
| ***General*** |
| G-1 | Scope of the Hurricane Model and Its Implementation |  |
| G-2 | Qualifications of Modeling Organization Personnel and Consultants Engaged in Development of the Hurricane Model |  |
| G-3 | Insured Exposure Location |  |
| G-4 | Independence of Hurricane Model Components |  |
| G-5 | Editorial Compliance |  |
|  |  |  |
| ***Meteorological*** |
| M-1 | Base Hurricane Storm Set | Significant Revision |
| M-2 | Hurricane Parameters and Characteristics |  |
| M-3 | Hurricane Probability Distributions |  |
| M-4 | Hurricane Windfield Structure |  |
| M-5 | Landfall and Over-Land Weakening Methodologies |  |
| M-6 | Logical Relationships of Hurricane Characteristics |  |
|  |  |  |
| ***Statistical*** |
| S-1 | Modeled Results and Goodness-of-Fit |  |
| S-2 | Sensitivity Analysis for Hurricane Model Output |  |
| S-3 | Uncertainty Analysis for Hurricane Model Output |  |
| S-4 | County Level Aggregation |  |
| S-5 | Replication of Known Hurricane Losses |  |
| S-6 | Comparison of Projected Hurricane Loss Costs |  |
|  |  |  |
| ***Vulnerability*** |
| V-1 | Derivation of Building Hurricane Vulnerability Functions |  |
| V-2 | Derivation of Contents and Time Element Hurricane Vulnerability Functions | Significant Revision |
| V-3 | Hurricane Mitigation Measures and Secondary Characteristics | Significant Revision |
|  |  |  |
| ***Actuarial*** |
| A-1 | Hurricane Modeling Input Data and Output Reports |  |
| A-2 | Hurricane Events Resulting in Modeled Hurricane Losses | Significant Revision |
| A-3 | Hurricane Coverages  |  |
| A-4 | Modeled Hurricane Loss Cost and Hurricane Probable Maximum Loss Level Considerations |  |
| A-5 | Hurricane Policy Conditions |  |
| A-6 | Hurricane Loss Outputs and Logical Relationships to Risk |  |
|  |  |  |
| ***Computer/Information*** |
| CI-1 | Hurricane Model Documentation | Significant Revision |
| CI-2 | Hurricane Model Requirements |  |
| CI-3 | Hurricane Model Architecture and Component Design | Significant Revision |
| CI-4 | Hurricane Model Implementation |  |
| CI-5 | Hurricane Model Verification |  |
| CI-6 | Hurricane Model Maintenance and Revision |  |
| CI-7 | Hurricane Model Security |  |

**Note:** *The Commission has determined that “significant revisions” are those that result in or have potential for changes to hurricane loss costs or hurricane probable maximum loss levels. The Commission may determine, in its judgment, whether a revision is significant.*