October 12, 2018
Floyd Yager, Chair
Florida Commission on Hurricane Loss Projection Methodology
c/o Donna Sirmons
Florida State Board of Administration
1801 Hermitage Boulevard, Suite 100
Tallahassee, Florida 32308

Re: AIR Hurricane Model for the United States Version 16.1.0 as Implemented in Touchstone Version 6.0.0

Dear Mr. Yager:

Thank you for the Commission's review of AIR's submission and the follow-up questions from September 18, 2018. Our answers to these questions are given below.

1. How does Model Builder configure in the currently approved model architecture? How was the Model Builder tool used to generate the results submitted with this interim update? The cover letter indicates that Model Builder is a standalone tool that allows clients to substitute some of their own model components or data structures within AIR's approved model. Such a substitution would produce results that would not be accepted as meeting the Commission standards. If there were no such substitutions (i.e., AIR using its approved component parts and overall model structure), how does AIR avoid the possibility of Model Builder interfering with or impacting results generated from its accepted model?

   The Model Builder tool was not used to generate the results submitted with this interim update.

   Model Builder is a tool that works independently of the currently approved model architecture. However, the original architecture of Touchstone was designed to be "open" to allow users to bring in external models. For example, the ERN Earthquake Model for Mexico can be licensed from ERN and configured to be run in Touchstone.

   The output of the Model Builder tool is a User Model that can be brought into Touchstone via an import process. The high-level workflow for using Model builder is shown below:

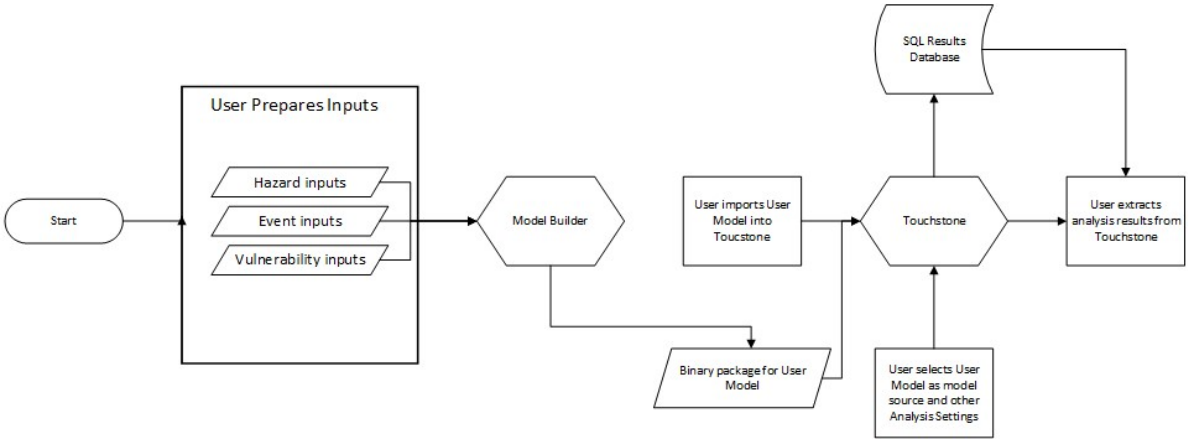

Figure 1. High-level workflow for using Model Builder

   The software platform, Touchstone, contains separate components related to each model; the AIR U.S. Hurricane model submitted and found acceptable by the Florida Commission on Hurricane Loss Projection Methodology (FCHLPM) has its own set of data files and source code that are separate from every other model in Touchstone. When AIR releases each version

of Touchstone, we compile the software which includes these separate binary file sets for each model as a part of the install package.

When using Touchstone for catastrophe loss analyses, a user can run, for example, a U.S. Earthquake and Hurricane analysis together, and Touchstone will process each peril separately to produce the loss estimates based on the stochastic simulations. Throughout the loss simulation, Touchstone communicates with the underlying SQL databases and tables. Every loss analysis conducted by a user produces a distinct set of results tables in SQL in which are stored losses for each stochastic event; in the tables, the combination of event ID and model code is different for each peril. The same is true when a user runs an analysis with a User Model from Model Builder. The user can identify their analysis and the accompanying analysis results both in the User Interface and in the SQL back-end. Two figures below show separate SQL tables; the first one contains loss results from an analysis using a User Model; the second contains results from an analysis using the AIR U.S. Hurricane model. Model Code 106 is the User Model, which is named by the user on import. Model Code = 27 is the AIR hurricane model. Model Builder prevents a user from naming their model with a number less than 100 because those model numbers are already allocated to AIR's own models in the system.

CatalogTypeCode	EventID	ModelCode	YearID	PerilSetCode	GroundUpLoss
STC	4	106	1	1	131.2929765282...
STC	18	106	1	1	336816.0822903...
STC	41	106	1	1	5184425.826695...
STC	55	106	2	1	22047.21139639...
STC	202	106	6	1	4576.079501289...
STC	240	106	7	1	174717.6673239...
STC	242	106	7	1	59874.69679601...
STC	287	106	8	1	3639.440340867...
STC	293	106	8	1	22008.83273101...
STC	320	106	8	1	12361607.04087...
STC	325	106	8	1	10861369.17266...
STC	329	106	9	1	7976413.293736...
STC	365	106	10	1	2477961.823794...
STC	406	106	10	1	57271.70441499...
STC	412	106	11	1	145837.2708198...

Figure 2. Touchstone SQL table with sample loss results from a user-created model with ModelCode = 106

CatalogTypeCode	EventID	ModelCode	YearID	PerilSetCode	GroundUpLoss
STC	21	27	2	1	1146142.29061149
STC	80	27	3	1	106158793.919696
STC	89	27	4	1	5955228.42107255
STC	181	27	7	1	4383045.86196836
STC	293	27	11	1	23642332.0169548
STC	300	27	11	1	409242.955029019
STC	398	27	15	1	40300045.6623975
STC	451	27	17	1	5352073.29834723
STC	490	27	19	1	18133512.5112663
STC	498	27	19	1	3695430.51423864
STC	518	27	20	1	32284154.8654919
STC	580	27	22	1	22409922.5918028
STC	671	27	26	1	35267922.7966226
STC	696	27	27	1	3447.81885423484
STC	766	27	30	1	188729666.679807
STC	770	27	30	1	198087.242741558
STC	779	27	30	1	24874365.6824048

Figure 3. Touchstone SQL table with sample loss results from AIRs hurricane model (ModelCode = 27)

The user producing modeled results for a rate filing in Florida is expected to use AIR's US Hurricane Model since it has been submitted and found acceptable by the FCHLPM. The Florida statutes governing rate filings are clear about which models may be used, and we expect our clients to be able to discern the difference between a model they generate using Model Builder and AIR's hurricane model. The analysis logs provided from Touchstone will indicate whether a user-supplied model has been used, as illustrated in Figure 1 from our August 31, 2018 letter.

2. Output material is documented in the analysis log as to the origin of the event set type and hazard models. This analysis log looks much different than the analysis log in the submission for AIR Hurricane Model for the U.S. V16.0.0 as Implemented in Touchstone V4.1.0 (January 2017). What differences could there be with respect to AIR versus User versions? The red boxes highlight where to look, but in the absence of these guides, how does one know if the generated results are all AIR driven or include some User aspects? Provide an analysis log that produced the interim update values.

   AIR uses the exact same software as its clients, so there is no difference between AIR and User versions of logs. We formatted the content of the analysis log provided in the submission so that it prints readably on an 8.5" piece of paper. The original log that was used for that purpose in the last submission is attached as ATTACHMENT A. Also, as you requested we're providing an analysis log that produced the Touchstone 6.0 interim update values for Form A-1; this is called Attachment B.

   The auditor of the catastrophe loss analysis results and accompanying analysis log will be expected to interpret its contents or ask AIR for assistance. To identify User aspects of an analysis log, the auditor can ask AIR or the insurer who provided the log for guidance.

3. With respect to the User Interface and Navigation Enhancements, how do these updates impact what the Professional Team looks at with respect to the Commission submission and forms? The accompanying letter notes: "In general, the overall street match/geocoding improves by 1 to 2% with each annual release." What do these percentages mean (i.e., 1 to 2% of what)? To what extent have the algorithms and methods using the new data changed from the previously accepted version?

   None of the other User Interface and Navigation Enhancements impact what the Professional Team looks at with respect to the Commission submission and forms. They are simply part of the software update, which the FCHLPM views as the "model" and requires us to report changes on.

The Interim Geographical Data Update and accompanying street match/geocoding improvements of 1-2% mentioned in the letter refer to the proportion of imported risks that achieve a higher geocode match level. In other words, the same portfolio of risks imported and geocoded in Touchstone 4.1 vs 6.0 will achieve 1-2% improvement in the overall geocode match level. This measurement is somewhat fuzzy. For example, the two examples below show a 1-2% improvement in overall geocode match levels, but in the second example, the % of risks geocoded at the highest geocode match level is higher.

Illustrative Geocoding Results				
Example 1		Touchstone 4.1	Touchstone 6.0	
Resolution Level	Geocode Match Level	Number of Risks	Number of Risks	Percent Increase
High	Point	900	909	1%
Medium	Relaxed	50	51	2%
Low	Postal Centroid	50	40	-20%
		1000	1000	0%
Example 2		Touchstone 4.1	Touchstone 6.0	
Resolution Level	Geocode Match Level	Number of Risks	Number of Risks	Percent Increase
High	Point	950	960	1%
Medium	Relaxed	40	41	2%
Low	Postal Centroid	50	39	-22%
		1040	1040	0%

Figure 4. Illustrations of 1-2% improvement in geocode match levels

4. In the Excel files, the model release date is given as 7/17/2017 rather than the date associated with the release given in the first sentence of the August 31, 2018 letter to Commissioner Yager.

   The date referenced by the first sentence of the August 31, 2018 letter is when we released Touchstone 6.0 to clients. The date used in the header of the Excel files is the date the software development team internally releases the AIR U.S. Hurricane model. AIR's versioning system found on page 203 of our submission differentiates between the model and the software. Unless the trigger for changing the hurricane model version occurs, the software development team does not re-release the hurricane model and both the hurricane model version number and its release date stay the same.

Best regards,

Brandie Andrews, CEEM
Vice President, Regulatory and Rating Agency Client Services