APPLIED RESEARCH ASSOCIATES, INC.

July 12, 2019

Chairman Floyd Yager, FCAS
Florida Commission on Hurricane Loss Projection Methodology
1801 Hermitage Boulevard, Suite 100
Tallahassee, FL 32308

Re: Notification of Typographical Error in Response to Standard V-1, Disclosure 6 of ARA's Submission Dated April 9, 2019 for HurLoss version 9.0

Dear Chairman Yager:

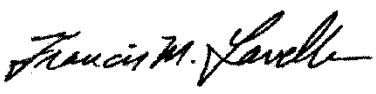
Applied Research Associates, Inc. (ARA) would like to correct a typographical error in our response to Standard V-1, Disclosure 6 of our submission dated April 9, 2019 for HurLoss version 9.0. In our description of the primary characteristics in our residential building vulnerability functions, we provided an incorrect breakpoint between our two most recent residential construction eras. Instead of 2008-2013 and 2014-present, the actual eras used in our approved model are 2008-2012 and 2013-present. The error was noted and discussed during our presentation to the Commission on June 12, 2019.

We have corrected the error and produced a new submission PDF. The changes are: (a) an additional revision date on the cover page (page 1), (b) revised text in Item 1.j in our response to Standard V-1, Disclosure 6 (page 87), and (c) revised signature dates on Forms G-1, G-4, and G-7 (pages 151, 154, and 157, respectively). The changed pages are dated July 12, 2019 in the footer. In addition to the revised full submission PDF without track changes, we are also providing a separate PDF of the five changed pages with track changes. We note that the change in our response to Standard V-1, Disclosure 6, does not appear as a new change because it is a revision to text that was added after our initial submission.

The model itself is completely unchanged. There is no impact on the hurricane loss costs and hurricane probable maximum loss levels produced by the model. Therefore, this correction constitutes a Type I difference as defined in Section VI.F on page 64 of the *Hurricane Standards Report of Activities as of November 1, 2017.* As the model itself is unchanged (i.e., it is the exact same model as found acceptable), there are no changes to submit for Forms V-2, A-1, A-4, A-8, or S-5.

We request that the Commission accept the revised submission document dated July 12, 2019, and post it to the Commission website in place of the April 9, 2019 version. If you have any questions about this issue, please contact me by phone at (919) 582-3350 or by e-mail at flavelle@ara.com.

Sincerely,



Francis M. Lavelle, Ph.D., P.E.
Vice President and Principal Engineer

8537 SIX FORKS ROAD, SUITE 600 ■ RALEIGH, NC 27615
(919) 582-3400 ■ FAX (919) 582-3401

Submitted: November 5, 2018
Revised: January 21, 2019
Revised: February 13, 2019
Revised: March 22, 2019
Revised: April 9, 2019
Revised July 12, 2019

HurLoss Version 9.0

Florida Commission on Hurricane Loss Projection Methodology

2017 Hurricane Standards

Prepared for:

Florida Commission on Hurricane Loss Projection Methodology
State Board of Administration
1801 Hermitage Boulevard
Tallahassee, Florida 32308

Prepared by:

Applied Research Associates, Inc.
IntraRisk Division
8537 Six Forks Road, Suite 600
Raleigh, North Carolina 27615

6. Describe the categories of the different building hurricane vulnerability functions. Specifically, include descriptions of the building types and characteristics, building height, number of stories, regions within the state of Florida, year of construction, and occupancy types for which a unique building hurricane vulnerability function is used. Provide the total number of building hurricane vulnerability functions available for use in the hurricane model for personal and commercial residential classifications.

~~The number of categories of different vulnerability functions used in a loss projection study depends on the objective of the study. For a basic analysis, wall construction is a common way to analyze and report results since insurers have wall construction classes. On the other hand, to develop a classification for wind vulnerability, many key building variables may be evaluated. In summary, the vulnerability functions may be based on either fine-grained or coarse-grained representations of the construction parameters. Examples of the number of categories or building classes considered in loss projection studies have been reviewed with the professional team.~~

~~The basis for differentiation is the building performance model, which uses engineering analysis, empirical data, and judgment.~~ The building categories used in the model are built up from detailed engineering load and resistance models that take into account number of stories, building shape, roof shape, roof cover, garage doors, roof-wall connection, sheathing attachment, etc. For each building, damage and loss are estimated for the building, appurtenances, contents, and loss of use. Once the losses have been generated, fast-running vulnerability (loss) functions are developed for the different coverages, etc., for each building class ~~in each of four regions~~, era, and region within the state of Florida. In this manner, the appropriate building vulnerability information is captured in the respective vulnerability functions used in the loss projection.

The primary classification characteristics of the building vulnerability functions are:

1. Residential
    a. Construction: Frame, masonry, unknown
    b. Stories: One, two or more, unknown
    c. Roof shape: Hip, gable, unknown
    d. Roof slope: Low, high, unknown
    e. Roof cover: Tile, shingle, FBC tile, FBC shingle, unknown
    f. Roof deck: 6d@6/12, 8d@6/12, 8d@6/6, unknown
    g. Roof-wall: Toe nailed, clipped, strapped, unknown
    h. Opening protection: None, impact-rated, unknown
    i. Secondary water resistance: No, yes, unknown
    j. Eras: Pre-1966, 1966-1994, 1995-2002, 2003-2007, 2008-2012, 2013-present, unknown
    k. Regions:
        i. Pre-2003: Southeast, South, Central, North Florida
        ii. 2003-Present: Monroe, HVHZ, Palm Beach, WBDR, Non-WBDR
2. Mobile Homes
    a. Tie-downs: No, yes, unknown

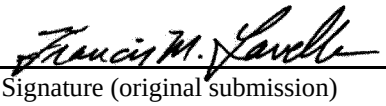
APPENDIX A - FORMS

Form G-1: General Standards Expert Certification

I hereby certify that I have reviewed the current submission of HurLoss (Name of Hurricane Model) Version 9.0

for compliance with the 2017 Hurricane Standards adopted by the Florida Commission on Hurricane Loss Projection Methodology and hereby certify that:

1) The hurricane model meets the General Standards (G1 – G5);
2) The disclosures and forms related to the General Standards section are editorially and technically accurate, reliable, unbiased, and complete;
3) My review was completed in accordance with the professional standards and code of ethical conduct for my profession;
4) My review involved ensuring the consistency of the content in all sections of the submission; and
5) In expressing my opinion I have not been influenced by any other party in order to bias or prejudice my opinion.

Francis M. Lavelle	Ph.D., P.E., (Engineering)
Name	Professional Credentials (area of expertise)
	11/5/2018
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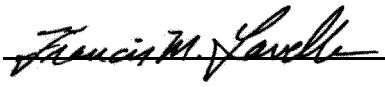
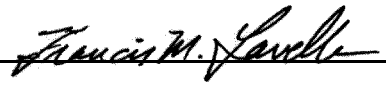
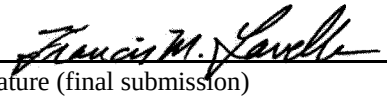
	1/21/2019
Signature (~~revision to submission~~response to deficiencies, if any)	
	3/21/2019
Signature (~~response to deficiencies, if any)~~revisions to submission, if any	Date
	7/12/2019
Signature (final submission)	Date

An updated signature and form are required following any modification of the hurricane model and any revision of the original submission. If a signatory differs from the original signatory, provide the printed name and professional credentials for any new signatories. Additional signature lines shall be added as necessary with the following format:

Signature (revision to submission)	Date

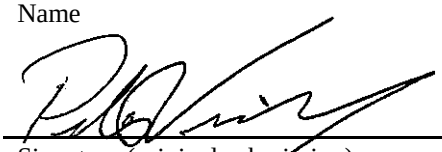
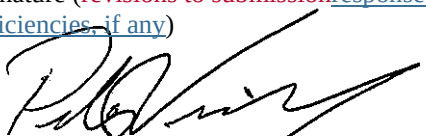
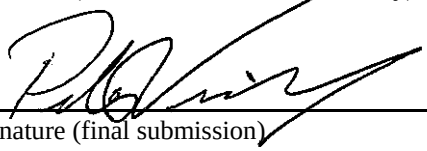
NOTE: A facsimile or any properly reproduced signature will be acceptable to meet this requirement.

Form G-4: Vulnerability Standards Expert Certification

I hereby certify that I have reviewed the current submission of HurLoss (Name of Hurricane Model) Version 9.0

for compliance with the 2017 Hurricane Standards adopted by the Florida Commission on Hurricane Loss Projection Methodology and hereby certify that:

1) The hurricane model meets the Vulnerability Standards (V1 – V3);
2) The disclosures and forms related to the Vulnerability Standards section are editorially and technically accurate, reliable, unbiased, and complete;
3) My review was completed in accordance with the professional standards and code of ethical conduct for my profession; and
4) In expressing my opinion I have not been influenced by any other party in order to bias or prejudice my opinion.

Peter J. Vickery	Ph.D., P.E., (Engineering Sciences)
Name	Professional Credentials (area of expertise)
	11/5/2018
Signature (original submission)	Date
	1/21/2019
Signature (~~revisions to submission~~response to deficiencies, if any)	Date
	3/21/2019
Signature (revisions to submission, if any)	Date
	7/12/2019
Signature (final submission)	Date

An updated signature and form are required following any modification of the hurricane model and any revision of the original submission. If a signatory differs from the original signatory, provide the printed name and professional credentials for any new signatories. Additional signature lines shall be added as necessary with the following format:

Signature (revision to submission)	Date

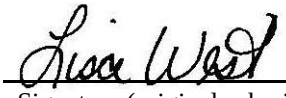
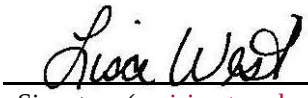
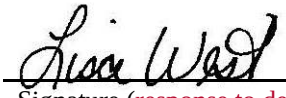
NOTE: A facsimile or any properly reproduced signature will be acceptable to meet this requirement.

Form G-7: Editorial Certification

I hereby certify that I have reviewed the current submission of HurLoss (Name of Hurricane Model) Version 9.0

for compliance with the "Process for Determining the Acceptability of a Computer Simulation Hurricane Model" adopted by the Florida Commission on Hurricane Loss Projection Methodology in its *Hurricane Standards Report of Activities as of November 1, 2017*, and hereby certify that:

1) The hurricane model submission is in compliance with the Notification Requirements and General Standard G-5 (Editorial Compliance);
2) The disclosures and forms related to each hurricane standards section are editorially accurate and contain complete information and any changes that have been made to the submission during the review process have been reviewed for completeness, grammatical correctness, and typographical errors;
3) There are no incomplete responses, charts or graphs, inaccurate citations, or extraneous text or references;
4) The current version of the hurricane model submission has been reviewed for grammatical correctness, typographical errors, completeness, the exclusion of extraneous data/ information and is otherwise acceptable for publication; and
5) In expressing my opinion I have not been influenced by any other party in order to bias or prejudice my opinion.

Lisa West	B.S. (Technical Editing)
Name	Professional Credentials (area of expertise)
	11/5/2018
Signature (original submission)	Date
	1/21/2019
Signature (~~revision to submission~~response to deficiencies, if any)	
	3/21/2019
Signature (~~response to deficiencies, if any~~revisions to submission, if any)	Date
	7/12/2019
Signature (final submission)	Date

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Signature (revision to submission)	Date

NOTE: A facsimile or any properly reproduced signature will be acceptable to meet this requirement.