**DRAFT**

TO: Company Field Test Contact

FROM: Mike Boerner, Texas Department of Insurance

 Chair of the Life Actuarial (A) Task Force

DATE: TBD

RE: Economic Scenario Generator (ESG) Field Test Instructions, Results Templates, and Qualitative Survey

The Texas Department of Insurance is reaching out to all companies participating in the ESG field test to be conducted from June through August. Thank you for participating in the field test. Please follow the field test instructions contained in Appendix A, and use the templates provided to submit your results. Also, please complete the Qualitative Survey contained in Appendix B as applicable for the product types tested.

**Confidentiality**

This information is being requested under both the authority of the general examination authority of the Texas Department of Insurance pursuant to Tex. Ins. Code §§ 401.051, *et seq.,* and the Standard Valuation Law, Tex. Ins. Code §§ 425.051, *et seq*., and is considered to be confidential under these provisions. These provisions also permit the Texas Department of Insurance to share this confidential information with other state regulators and the NAIC, including the Life Actuarial (A) Task Force (LATF), the Life RBC (E) Working Group, the Valuation Analysis (E) Working Group (VAWG), and NAIC staff. Your company specific information will remain confidential pursuant to these statutory provisions.

**Additional Instructions**

Prior to 6/1/22, please confirm receipt of this email.

If you have questions regarding the field test instructions or templates, please contact Scott O’Neal at soneal@naic.org.

Your field test results are requested by 8/31/2022. The subject line should start with the company’s NAIC number, followed by “ESG Field Test”. Email your response to: Actuarialdivision@tdi.texas.gov, and CC Rachel.Hemphill@tdi.texas.gov and Yujie.Huang@tdi.texas.gov.

Thanks,

Mike

**Appendix A**

**Economic Scenario Generator (ESG) Field Test Instructions**

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# Introduction

## Background

Work is in progress to develop a new ESG to be prescribed for use in calculations of life and annuity Statutory reserves according to the *Valuation Manual* (e.g. VM-20, VM-21) and capital under the NAIC RBC requirements (e.g. C3 Phase 1, C3 Phase 2). Based on preliminary AAA model office testing, the implementation of a new ESG may materially increase life and annuity reserves and capital. The purpose of the ESG field test is to assess the impacts for different product types, gain a better understanding of the drivers of reserve and capital differences, and determine potential ESG modifications that may be desirable for a second field test tentatively planned for early 2023.

This document should be read in conjunction with the document titled “Economic Scenario Generator (ESG) Reserves and Capital Field Test Specifications”. Some of the information from that document is repeated here, but with greater detail.

## Communication of Field Test Results

NAIC staff will compile aggregated results in a report that will not contain any company-specific or other company-identifiable information. Assuming that companies have completed the field test by the end of August, the compilation of results is expected to be completed by the end of September, 2022. Joint LATF/LRBC WG open meetings will then be held to discuss aggregate field test results, and to determine whether ESG modifications should be made based on the results of the field test.

## Next Steps

1. After the June field test begins, there may be additional optional runs requested (e.g. an alternative equity model calibration from the ACLI)
2. A second field test is expected to be conducted in early 2023. This field test may include:
* Calibration changes for the Treasury, Equity, and Corporate Bond models desired by regulators.
* Testing of alternative simplified models. For example, the Academy is currently developing a simplified Corporate Bond model. The ACLI is also developing an alternative model.
* Any structural changes to the Conning Treasury, Equity, and Corporate Bond models desired by regulators after a review of results from the first field test. Structural ESG changes will require a programming effort, and the amount of time needed to complete this will depend on the nature of the changes. Examples of structural changes would include any modification to the linkage between the Treasury model and the Equity model, and implementation of an alternative simplified Corporate model.
1. Prior to ESG implementation, related *Valuation Manual* and RBC instruction changes will be drafted for consideration and adoption.

# General Field Test Instructions

## Summary of Field Test Runs

The runs needed for the field test are summarized in the table below. The Baseline #1 results already exist; they should match the values from year-end 2021 statutory reporting. The Baseline #1 and Baseline #2 results should reflect the ESG the company used for statutory reporting, whether it was a version of the Academy ESG or a proprietary ESG. Similarly, the Baseline runs should reflect the models companies used for year-end reporting, whether they were as of 12/31/21 or 9/30/21. For companies that typically produce results as of 9/30 (e.g. for C3 Phase I), 9/30 scenarios will be provided Tests 1a, 1b, 5a, and 6.

The table below lists the elements of the field test and identifies them as either “required” or “optional”. Required results are considered most important to the success of the field test. It is hoped that participating companies will provide results for these items, and as many of the optional items as possible. However, it is recognized that companies may not have the capacity to produce everything due to resource constraints. If this is the case, it is preferable that companies provide partial results rather than not participate in the field test at all. Further technical details behind the ESG calibration are provided in the PowerPoint embedded below.



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Field Test Runs\*\*** | **Scenario Sets** | **Inforce Assets and Liabilities** | **Priority** | **Required or Optional** |
| Baseline #1Already exists; no new runs needed. | Scenario set(s) the company used for 12/31/21 statutory reporting of reserves and RBC | As of 12/31/21 | N/A | Required |
| Baseline #2 | ESG the company used for 12/31/21 statutory reporting of reserves and RBC, but modified to produce scenario sets with a 12/31/19 yield curve modified using a 200 BP increase across all maturities | As of 12/31/21 with appropriate adjustments to inforce\* | 10 | Optional |
| Test #1a | GEMS Baseline Equity and Corporate model scenarios as of 12/31/21, and Conning Treasury model calibration with generalized fractional floor as of 12/31/21 | As of 12/31/21 | 1 | Required |
| Test #1b | Same as Test #1a, but with Alternative Treasury model calibration with shadow floor as of 12/31/21 | As of 12/31/21 | 2 | Required |
| Test #2aSensitivity Test with Higher Interest Rates | Same as Test #1a, but with Equity, Corporate, and Treasury models with a 12/31/19 starting yield curve modified using a 200 BP increase across all maturities | As of 12/31/21 with appropriate adjustments to inforce\* | 3 | Required |
| Test #2bSensitivity Test with Higher Interest Rates | Same as Test #1b, but with Equity, Corporate, and Treasury models with a 12/31/19 starting yield curve using a 200 BP increase across all maturities | As of 12/31/21 with appropriate adjustments to inforce\* | 4 | Required |
| Test #3:Attribution Analysis Run | Conning Treasury model calibration with generalized fractional floor as of 12/31/21, GEMS Corporate model as of 12/31/21, and GEMS Equity model corresponding to a 12/31/19 yield curve with a 200 BP increase across all maturities | As of 12/31/21  | 7 | Optional |
| Test #4:Attribution Analysis Run | Same as Test #3, but using Alternative Treasury model calibration with shadow floor as of 12/31/21 | As of 12/31/21  | 8 | Optional |
| Test #5a:Conning Original Equity Calibration | Same as #1a, but with Conning’s original Equity model calibration that had significantly lower Gross Wealth Factor’s than the AIRG Equity. | As of 12/31/21 | 5 | Required |
| Test #5b:Conning Original Equity Calibration | Same as #2a, but with Conning’s original Equity model calibration that had significantly lower Gross Wealth Factor’s than the AIRG Equity. | As of 12/31/21 with appropriate adjustments to inforce\* | 6 | Required |
| Test #6:ACLI Alternative Equity Calibration | Same as #1a, but with the ACLI’s Alternative Equity Calibration | As of 12/31/21 | 9 | Optional |
| Test #7: C3 Phase I Specific Attribution | 12/31/21 scenarios from the prescribed C3 Phase I generator modified to set the Mean Reversion Parameter to 3.25% | As of 12/31/21 | 11 | Optional |

## \*More information on adjustments to be added later

 \*\*After the June field test begins, there may be additional optional runs requested (e.g. an alternative equity model calibration from the ACLI)

## Framework Specific Required and Optional Quantitative Results

The table below illustrates the framework specific results that are required to be produced as part of the field test along with optional components that companies may elect to provide.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Field Test Element** | **Required for VM-21 and C3 Phase II** | **Required for VM-20** | **Required for C3 Phase 1** | **Optional** |
| Post reinsurance ceded results | X | X | X |  |
| Pre-reinsurance ceded results |  |  |  | X |
| Stochastic Reserve | X | X |  |  |
| Scenario Reserves, before cash surrender value floor | X | X |  |  |
| Scenario Reserves, after cash surrender value floor | X | X |  |  |
| CTE70 Best Efforts | X |  |  |  |
| CTE70 Adjusted | X |  |  |  |
| Additional Standard Projection Amount | X |  |  |  |
| CTE98 (for C3 Phase II) | X |  |  |  |
| Deterministic Reserve |  | X |  |  |
| NPR |  | X |  |  |
| Results from each of the 16 SERT Scenarios, and SERT ratio |  | X |  | For VM-21 and C3P1 |

## Number of Scenarios

For each product type to be tested, the number of scenarios used for field testing should match the number the company used for statutory reporting on 12/31/21. The number of scenarios used may vary by product type, as long as it is consistent with the number used for statutory reporting. For example, if 1,000 scenarios were run for variable annuity reserves reported as of 12/31/21, then 1,000 scenarios should be run as of that valuation date for the field test. Similarly, if 200 scenarios were run for life insurance reserves reported as of 12/31/21, then 200 scenarios should be run for the field test as of that valuation date. If it is not possible for participants to run at least as many scenarios for the field test runs corresponding to the relevant 12/31/21 valuation, participants may elect to complete the field test runs using less scenarios. If participants use a different number of scenarios between the baseline and field test runs, this should be explained in the survey questions.

## Scenario Sets

1. Scenario files – The scenario sets to be used for the field test, along with descriptions of the file formats, will be available for download at <https://naic.conning.com/scenariofiles>. Statistical summaries of the projections will also be provided, along with the parameters used for the ESG.
2. Scenario subsets - A full scenario file containing 10,000 scenarios will be provided for each model run to be tested. Scenario subsets of 1,000, 500, 200, and 40 scenarios will also be available.
3. Monthly Timestep – all scenario files will be provided using a monthly projection timestep
4. Additional scenario sets – The following additional scenarios are available:
* 16 Stochastic Exclusion Ratio Test (SERT) scenarios
* TBD - Company-Specific Market Path (CSMP) scenarios

## Projection Period

Each scenario file contains monthly projections for 100 years. For each product type to be tested, the length of the projection period used for field testing should match the projection period the company used for statutory reporting as of 12/31/21.

## Negative Interest Rates

The two ESG Treasury models used for the field test include scenarios with negative interest rates, so companies will need to consider whether any modeling or assumption changes are needed to handle this. It is recommended that companies read and consider the information in the paper below:

[Potential Modeling Challenges in a Negative Interest Rate Environment](https://www.milliman.com/en/insight/potential-modeling-challenges-in-a-negative-interest-rate-environment)

Author: Zohair Motiwalla, FSA, MAAA

 Principal and Consulting Actuary, Milliman

For purposes of the field test, companies may make assumption changes as appropriate to reflect negative interest rates, but this is not required given the amount of time this may take. The Qualitative Survey asks companies to provide details on whether assumption changes were made, and the nature of the changes. It also asks companies to comment on any changes anticipated to be made when the new ESG is adopted.

## Model Simplifications

If the company is not able to provide model results that match reported values, the company may run a representative model or inforce population. The company should then either adjust the final results to align with their reported amount, or alternatively, they should adjust their reported amount to align with the representative business that is being field tested.

## Hedging (as applicable)

The hedging strategy the company used as of 12/31/21 for statutory reporting should be used for the field test runs.

## Fund Mapping (as applicable)

The company’s fund mapping used as of 12/31/21 for statutory reporting should be used for the field test to allow for a more direct comparison of results from the Academy ESG (or proprietary ESG) vs. the GEMS ESG. Although the GEMS ESG contains additional equity and bond fund returns for a more refined mapping of funds, these should not be used for the field test. However, if certain company circumstances (e.g. company reports using a proprietary ESG) exist where it is not practical or possible to use the same fund mapping, companies may use judgement to determine an appropriate fund mapping for the field test. Please see the survey question related to the fund mapping to provide more information.

The tables below show the equity and bond returns available from the Academy ESG and the comparable returns offered in the GEMS equity and corporate bond models. For the field test, companies should use the appropriate GEMS returns that correspond to their fund mapping as of each valuation date.

Further information on fund mapping can be found in the results templates

\*Source: AAA LCAS C3 Phase II RBC for Variable Annuities: Pre-Packaged Scenarios January 2006

\*\* See [Basic Data Columns](https://azspcngcms.blob.core.windows.net/sitecoremedia/project/naic/files/latf-esg-exposure-12%2C-d-%2C18%2C-d-%2C20/basic-data-columns.pdf) for more information on the returns available in the GEMS® scenario files

\*\*\*The Academy Equity Model Aggressive Equity proxy is not meant to suggest a representative asset profile for this class but used merely to build an historic index with high volatility and sufficient history.

# Additional Instructions for VM-21

## Model Assumptions

Models should utilize company and/or prescribed assumptions relevant to VM-21 for 12/31/21 statutory reporting unless otherwise specified. All components of the modeling other than the scenarios should remain the same between reported and field test runs (e.g., the same investment strategy, liability assumptions, CDHS modeling, etc.).

## Aggregation

Business should be aggregated according to the requirements under VM-21, consistent with how this was done for statutory reporting on 12/31/21. For example, if RILAs were aggregated with variable annuities for statutory reporting, they should be aggregated for the field test.

# Additional Instructions for VM-20

## Model Assumptions

Models should utilize company and/or prescribed assumptions relevant to VM-20 for 12/31/21 statutory reporting unless otherwise specified. All components of the modeling other than the scenarios should remain the same between reported and field test runs (e.g., the same investment strategy, liability assumptions, CDHS modeling, etc.).

## Exclusion Tests

1. Deterministic Exclusion Test - This is not applicable for purposes of the field test and should not be performed.
2. Stochastic Exclusion Ratio Test – The SERT should be performed unless the company has not built out that functionality in their models. The results may help determine whether the SERT still performs as intended using the new ESG.

## Stochastic Reserve Calculation

1. The Stochastic Reserve should be calculated unless the company has not built out that functionality in their models.
2. Participants will be asked to provide the annual projected accumulation of deficiencies by scenario for each year included in the projection. When the NAIC is reviewing the results, they will implement an alternative discounting methodology that applies a 95% factor to the 1-year UST when negative. The alternatively discounted scenario level results will be compared against the company provided results using the prescribed discounting methodology and aggregate results will be shared publicly.

# Additional Instructions for C-3 Phase I

## Methodology

1. Companies should use the current C-3 Phase I methodology for the field test, with the exception noted in Section B below. A future VM-22 field test will include both the new ESG and new C-3 Phase I methodology.
2. Participants will be asked to provide the annual projected surplus values by scenario for each year included in the projection. When the NAIC is reviewing the results, they will implement an alternative discounting methodology that applies a 95% factor to the 1-year UST when negative. The alternatively discounted scenario level results will be compared against the company provided results using the prescribed discounting methodology and aggregate results will be shared publicly.

## Number of Scenarios

For Tests 1a – Test 4 (see the table in Section II.A), companies should run a minimum of 200 scenarios.

# Attribution Analysis

Attribution analyses are included in the field test in the following runs:

* Test #3 and #4
	+ Test #3 serves to identify the ESG model drivers (Equity, or Treasury and Corporate) for the reserve/capital changes between Test #1a and #2a. Test #4 serves a similar purpose to attribute the change in results between Test #1b and #2b.
* Test #7: C3 Phase I Specific Attribution
	+ This test will evaluate the impact of lowering the mean reversion parameter (MRP) in the currently prescribed C3 Phase I generator to be consistent to the MRP used in the ESG prescribed in VM-20. The results of this test will serve as an interim point of comparison between the baseline and field test runs.

# Reporting of Field Test Results

## Results Templates

Companies should provide quantitative field test results using the Excel templates that have been developed for this purpose. Instructions are included in the templates. The spreadsheet tabs may be copied as needed within the workbook to reflect any additional products/models not included.

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## Qualitative Survey

Companies are asked to complete the Qualitative Survey contained in Appendix B to the extent possible for the product types tested.

## NAIC Aggregation of Company Results

NAIC staff will be aggregating quantitative results across companies and producing a variety of metrics using SAS. For ease of aggregation, please do not add rows or columns to the results templates.

Field test participants’ responses to the Qualitative Survey will also be aggregated where appropriate.

**Appendix B**

**Economic Scenario Generator (ESG) Field Test**

**Qualitative Survey**

All companies are asked to provide responses to the survey questions below to the extent possible for the types of results submitted. The responses will aid in understanding how each company performed their modeling, and potential drivers of reserve and RBC differences by product type. The responses will also be used to identify potential ESG modifications that may be desirable for a second field test tentatively planned for early 2023.

I. VM-21 and C3 Phase II

1. Which valuation date was used for Baseline #1 (i.e. for year-end statutory reporting)?

[ ] 12/31/21 [ ] 9/30/21

1. How many scenarios were used for Baseline and field test runs?

[ ] 10,000 [ ] 1,000 [ ] 500 [ ] Other (please describe)

1. Baseline #1 should match what was reported in the Variable Annuities Supplement for Individual and Group business. Is this the case? [ ] Yes [ ] No If No, please explain (e.g., describe any subsets of contracts that were excluded or added for the Baseline, describe any simplifications used).
2. Was a proprietary ESG used to determine values for the Baseline runs? [ ] Yes [ ] No
3. Did the company make any changes to assumptions or modeling approach for the field test runs because the ESG produces negative interest rates?
	1. If so, please describe the changes that were made.
	2. If not, please describe the changes anticipated to be made when the new ESG is adopted.
4. Were any other changes to assumptions or modeling made for the field test runs? [ ] Yes [ ] No If Yes, please explain.
5. Did you use an implicit method or explicit method to model hedging?

[ ] Implicit method [ ] Explicit method [ ] Did not model hedging [ ] Other If Other, please explain.

1. If your company uses an implicit methodology to quantify the impacts of hedging, have you reassessed whether it is still appropriate in light of the field test scenario sets?
2. Did the new ESG impact hedge effectiveness? If so, can you tell what is driving this?
3. Where possible, please explain the change between the field test runs and the Baseline runs for the Post-Reinsurance-Ceded Reserve for Guaranteed Benefits, and optionally for Pre-Reinsurance-Ceded Reserve for Guaranteed Benefits. As part of your response, please address each of the following questions.
	1. What were the drivers of the change?
	2. How did the drivers interplay to result in the overall change? Were they additive, compounding, offsetting, etc.?
	3. How did the VA product guarantees affect the Baseline and field test results differently? In what way did the product guarantees contribute to the change in results?
	4. When comparing the field test runs to the Baseline, how did the sensitivities to equities vs. interest rates drive the magnitude of the change in results? In other words, how sensitive was the company’s portfolio to the change in the interest rate scenarios? Or, if the reserve amount is driven more by the equity levels, how would you characterize that relationship or dependence?
	5. Did the impact of hedging differ between the baseline and the Field Test? If so, in what way?
4. Where possible, please explain the change between the field test runs and the Baseline for the **Risk-Based Capital**. Please address the following as part of your response.
	1. Compare the impacts of the field test scenarios on the CTE 70 vs. CTE 98 tail metrics. Discuss the interplay and resulting impact on Risk-Based Capital.
	2. Are there distinct drivers that create different movements in the 30% vs. 2% tail?
	3. Are the impacts of hedging different when calculating the reserve vs. risk-based capital? Why or why not?
5. Does your company use the specific tax recognition or a macro-tax adjustment to determine post-tax capital amounts?
6. If the fund mapping for the field test scenarios had to change from what was included in the ESG used for reporting, please describe the new fund mapping and why it was necessary.

II. VM-20

1. Which valuation date was used for the Baseline run (i.e. for year-end statutory reporting)?

[ ] 12/31/21 [ ] 9/30/21

1. How many scenarios were used for the Baseline and field test runs?

[ ] 10,000 [ ] 1,000 [ ] 500 [ ] 200 [ ] 40 [ ] Differs by product type

Specify the details if selected “Differs by product type”:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. The Baseline should match what was reported in the VM-20 Reserves Supplement. Is this the case? [ ] Yes [ ] No If No, please explain (e.g., describe any subsets of contracts that were excluded or added for the Baseline, describe any simplifications used).
2. Was a proprietary ESG used for calculating the baseline? [ ] Yes [ ] No
3. Did the company make any changes to assumptions or modeling approach because the ESG produces negative interest rates?
4. If so, please describe the changes that were made.
5. If not, please describe the changes anticipated to be made when the new ESG is adopted.
6. Were any other changes to assumptions or modeling made for the field test runs? [ ] Yes [ ] No If Yes, please explain.
7. Did your dominant PBR reserve change?
8. If the fund mapping for the field test scenarios had to change from what was included in the ESG used for reporting, please describe the new fund mapping and why it was necessary.

III. C3 Phase I

1. Which valuation date was used for the Baseline (i.e. for year-end statutory reporting)?

[ ] 12/31/21 [ ] 9/30/21

1. How many scenarios were used for the Baseline run?

[ ] 50 [ ] 12 [ ] Other (please describe)

1. How many scenarios were used for field test runs?

[ ] 200 [ ] Other (please provide the number)

IV. All Products

1. All amounts populated in the templates should be shown in dollars. Is this the case? [ ] Yes [ ] No If No, what units did you use?
2. If the inforce files were adjusted for the field test runs, please describe the changes that were made.
3. To what extent did the field test runs capture the potential impact of the scenarios on results? Were there areas that could not be tested/assessed (e.g., due to the need for additional scenario sets, new or existing simplifications)?
4. What additional information / analysis or scenario refinements would your company recommend?
5. Please provide any additional perspectives and information that could be relevant in the post-field test assessment. This information could include observations, unexpected results, insights and desirable properties from alternative models/scenarios, etc. To allow for aggregation of company responses to this question, please categorize each of your comments as relating to "capital/reserves," "product specific issues," "attribution," or "other issues”.
6. Would your company need to create a more refined mapping to equity and bond funds given the expanded set of returns offered by the GEMS ESG? If yes, please provide a quantitative or qualitative explanation of how it might impact your results.
7. If your company elected to run a representative set of models or inforce, please describe any adjustments made to account for the difference between the representative models or inforce and the reported values. Also please provide an explanation as to why the models or inforce that was used in field testing is expected to be representative.
8. If a different number of scenarios was used for field test results as compared to the number of scenarios used in reporting, please provide information on which results are impacted.
9. Does your company use the specific tax recognition or a macro-tax adjustment to determine post-tax capital amounts?