**Economic Scenario Generator (ESG) Reserves and Capital Field Test Specifications**

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**Section I: Overview**

1. Objectives

The ESG Field Test should be able to address the following questions:

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| 1. **Reserve and Capital Impact**
 | * How does the new ESG impact industry reserves and capital in different economic environments?
* How do reserve and capital impacts vary by product type?
* What is the impact of the changes to each ESG model (i.e. interest rate model, equity model, corporate model)?

The impact will be determined by comparing reserves and capital calculated using the field test ESG scenario sets against results that were determined using currently prescribed or allowed ESGs used in Annual Statement and/or RBC reporting.  |
| 1. **Range of Results**
 | * What is the range of reserve and capital impacts across companies (e.g. percentage increase/decrease)?
* Which particular companies and product types have the highest and lowest impacts, and why?
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| 1. **Metrics**
 | * Which particular interest rate and equity scenarios cause the greatest stress?
* How do results compare for CTE70 vs. CTE98? Calculate different CTE levels (e.g., CTE70, CTE98, CTE90) to compare to existing requirements.
* How do the metrics perform with different scenario set sizes?
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| 1. **Stability Over Time**
 | * How do the reserve and capital results change across scenarios produced at different valuation dates?
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| 1. **Exclusion Testing and Reserve Components**
 | * Does the new ESG change the likelihood of the SR being the dominant reserve?
* Do the exclusion tests still perform as intended?
* Does the VM-20 DR scenario still capture risk appropriately?

Note: Companies that currently pass the stochastic exclusion test will not have a stochastic reserve model. |
| 1. **Hedging Impact**
 | * Does the new ESG impact hedge effectiveness? If so, what feature is driving this (e.g. the new ESG produces additional yield curve shapes, such as humps)?
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| 1. **Sensitivity Tests and Attribution**
 | * Do baseline results and/or sensitivity tests indicate that the field-tested ESG calibration needs to be modified?
* What are the drivers of reserve and capital changes as determined from attribution analysis?
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1. Tentative Timeline



 Note: Dotted lines represent the beginning of the month.

1. Structure
* NAIC to collaborate with the American Academy of Actuaries’ ESG Field Testing Subgroup and American Council of Life Insurer’s ESG Field testing group to design the NAIC ESG Field test. Field test recommendations will be brought to a joint meeting of the Life Actuarial (A) Task Force and the Life RBC (E) Working Group.
* Field Test Participants
	+ The NAIC has solicited volunteer companies to participate in the ESG field testing.
	+ Further analysis needs to be completed to assess product coverage.
	+ Additional participants may be requested if desired by regulators.
* The NAIC will also coordinate the following:
	+ Communicating with field test participants and providing ESG Field Test instructions and result templates.
	+ Collecting, aggregating, and summarizing company results
1. Reserve and Capital Frameworks Covered

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| --- | --- |
| **VM-20** | * All individual life insurance policies issued on or after the operative date of VM-20, or issued during the transition period, if elected by the company. Smaller insurance companies may obtain an exemption from VM-20 calculations.
* Stochastic reserves, Deterministic reserves, and stochastic exclusion ratio test (SERT) values will need to be field tested
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| **VM-21/C3 Phase II** | * Variable deferred or immediate annuity contracts whether or not they have GMDBs or VAGLBs, group annuity contracts containing GMDBs or VAGLBs, and policies or contracts with guarantees similar in nature to GMDBs or VAGLBs where there is no other explicit reserve requirement
* Stochastic Reserves and the Additional Standard Projection Amount will need to be field tested. Different CTE levels will need to be tested for reserves and capital
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| **VM-22/C3 Phase I** | * Include certain annuities (with the exception of indexed annuities) and single premium life insurance for C3 Phase I testing.
* Reported C3 Phase I capital will be compared against results produced using the field test scenario sets. Participants that are testing products according to the C3 Phase I methodology will be asked to use a choose a scenario set with at least 200 scenarios for the ESG field test candidates rather than scenario sets with 50 or 12 scenarios as used in reported C3 Phase I results.
* VM-22 methodology changes will be deferred to the VM-22 field test, and therefore VM-22 calculations are out of scope for this field test.
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1. Survey Questions
2. Do you use an implicit method or explicit method to model hedging?
3. If your company uses an implicit methodology to quantify the impacts of hedging, have you reassessed whether this implicit method is still appropriate in light of the field test scenario sets?
4. If hedges are modeled directly, how has the hedge effectiveness changed? Please provide comments to explain the change.
5. Were overall results consistent with expectations? If not, what is driving the difference?
6. Did your company use actual inforce and asset data as of each respective valuation date or use adjusted inforce and asset data? Please describe adjustments if made to all or some of the inforce and/or asset data.
7. If your company elected to run certain models as of a 9/30/XX date, please describe which set of results were produced using 9/30/XX dates.
8. 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.
9. Do you have any modeling simplifications or assumptions that may no longer be appropriate to use alongside the field test scenarios? Examples could include a modeling simplification of your company’s actual investment strategy or a dynamic lapse formula that may be impacted by the incorporation of negative Treasury rates. If so, please provide details on the simplifications and their expected impact on field test results.
10. 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.
11. 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.
12. Valuation Date
* Field test participants will be required to run their models using scenario files as of 12/31/20 and 12/31/21. Optionally, participants may elect to also to run their models as of 3/31/22.
* The valuation dates were selected for the following reasons:
	+ To select dates recent enough that participants will still have access to run the respective inforce and models that were utilized in reported results, and
	+ To test the model under different economic conditions.
* For companies that model certain lines of business only once a year and as of 9/30, scenario sets for 9/30/2020 and 9/30/2021 will be provided.

**Section II: Assumption and Model Specifications**

1. Population
* Use the actual inforce population corresponding to chosen valuation date. Alternatively, if actual inforce is not available for all valuation dates, use actual inforce as of 12/31/21 and make adjustments as appropriate.
* To the extent that it is not possible for a company to run all relevant statutory reserve and capital models for the field test, a company may elect to run a representative set of their models or inforce. Companies should then either adjust the final results to align with their reported reserve and/or capital amounts, or alternatively, they should adjust their reported amounts to align with the representative business that is being field tested.
1. Reserve/Capital Model Type
* Models should be capable of projecting asset and liability cashflows across numerous stochastic scenarios according to the requirements of the respective reserve or capital framework.
1. Asset/Liability Assumptions
* Utilize company and/or prescribed assumptions relevant to each respective reserve or capital framework.
* 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.).
1. ESG Models and Scenarios

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| --- | --- |
| **Model** | **Field Test Recommendation** |
| Treasury | 1. Field test two Treasury model candidates
 |
|  | * 1. Conning Calibration and Generalized Fractional Floor (“Non-shadow”)
 |
|  | * 1. Alternative Calibration and Shadow Floor (“Shadow”)
 |
| Equity | 1. Equity Utilize the existing GEMS® equity model with equity-Treasury linkage based on the short Treasury rate for field testing. Additionally, apply the following calibration updates:
 |
|  | 1. Update the equity model calibration to account for changes made to the Treasury model
 |
|  | 1. Apply a Sharpe-ratio approach with a 5% corridor to set the expected returns for the international equity indices
 |
| Corporate | 1. Include GEMS® corporate model in initial field testing with the calibration updated for consistency with other generated returns on a risk/reward basis
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* Field test participants will be provided scenario sets from the new ESG for field testing via the <https://naic.conning.com/scenariofiles> website.
* Parameters for the ESG and statistical summaries will be released alongside the scenarios
* 10,000 scenarios will be provided along with 1,000, 500, 200, and 40 scenario subsets
* As part of the field test, participants will be asked to compare results using the scenario sets from the new ESG to results that were determined using currently prescribed or allowed ESGs used in Annual Statement and/or RBC reporting. Field test participants will be responsible for obtaining scenario sets used for their reported results.
* Participants should run the same number of scenarios corresponding to their reported numbers for each respective reserve or capital model, with the exception of C3 Phase I which has alternative instructions. If there is a discrepancy between the number of scenarios used in reported as compared to the field test, please address this in the survey questions.
* Optionally, participants will also be asked to run the 16 SERT scenarios. This will be used to facilitate the results analysis. Since the SERT scenarios cover a range of interest rate and equity combinations, the results could be used to help explain and validate the stochastic results.
	+ Reasoning: When evaluating results from stochastic scenarios, one challenge is how to identify the drivers of reserve/capital change. Individual stochastic scenarios can be hard to describe, but the SERT scenarios were designed to capture changing economic environments that are easy to explain.
* Field test participants may choose the number of scenarios included in their calculation of reserves or capital for each line of business, with the exception of C3 Phase I where runs will be subject to a minimum of 200 scenarios.
1. Metrics/Output
* Reserve/Capital Framework specific results
	+ VM-20
		- Stochastic reserve
		- Deterministic reserve
		- Stochastic Exclusion Ratio Test results
	+ VM-21
		- Stochastic reserve
		- VM-21 CTE70 Best Efforts and CTE 70 Adjusted
		- Additional Standard Projection Amount
			* Company-Specific Market Path (CSMP) scenarios will be provided for testing
	+ C3 Phase II
		- Total Asset Requirement
		- C3 Charge
	+ C3 Phase I
		- Reserves that were cash flow tested for asset adequacy
		- The C3 Phase I results should be summarized by applying the weights in the table below to the respective percentiles.

 ------------------------ Percentile Weighting -------------------------¬

 92 92.5 93 93.5 94 94.5 95 95.5 96 96.5 97 97.5 98

 .02 .04 .06 .08 .10 .12 .16 .12 .10 .08 .06 .04 .02

* Reinsurance
	+ Companies should provide results on a post-reinsurance basis. Optionally, companies may provide results on a pre-reinsurance basis in addition to providing on a post-reinsurance basis.
* Provide the following metrics at time zero for all frameworks
	+ CTE70, CTE90, CTE98
	+ Optional Step: Calculate results according to the VM-20 Stochastic Exclusion Ratio Test (SERT) scenarios for all products, regardless of framework
* Participants will also be asked to provide scenario level results by projection timestep according to the respective reserve or capital framework. For example, companies will be asked to provide the present value of accumulated deficiencies at time zero and future timesteps for the VM-20 stochastic reserve calculation.
1. Aggregation
* Field test participants are allowed to aggregate business according to the requirements of each respective reserve or capital framework. For example, participants electing to include whole life insurance and term insurance in their testing may aggregate within the established VM-20 Reserving Categories, but not across the categories.
1. Fund Mapping
* The GEMS ESG contains additional equity and bond fund returns that would allow for a more refined mapping of funds. Companies shall use their existing fund mapping rather than create a more refined fund mapping. A survey question will ask participants to qualitatively or quantitatively address how their results would be impacted by including a more refined fund mapping.

**Section III: Attribution Analysis**

Note: We are seeking comment on how attribution analyses could be incorporated into the ESG Field Test along with recommendations for particular areas of focus.

**Section IV: Resources**

1. AIRG used for C-3 Phase I
* [Life Risk-Based Capital (E) Working Group](https://content.naic.org/cmte_e_lrbc.htm)
1. AIRG used for C-3 Phase II, VM-20, and VM-21
* [Society of Actuaries Resource Page for Economic Scenario Generators](https://www.soa.org/resources/tables-calcs-tools/research-scenario/)
1. [Proposed SERT Scenario Methodology](https://azspcngcms.blob.core.windows.net/sitecoremedia/project/naic/files/latf-esg-exposure-1%2C-d-%2C21%2C-d-%2C21-for-sert/1%2C-d-%2C21%2C-d-%2C21-exposure-_-stochastic-exclusion-ratio-test.docx)
2. [Proposed Scenario Subset Selection Methodology](https://azspcngcms.blob.core.windows.net/sitecoremedia/project/naic/files/latf-esg-exposure-1%2C-d-%2C21%2C-d-%2C21-for-scenario-picker/1%2C-d-%2C21%2C-d-%2C21-exposure-_-esg-scenario-picker-tool.docx)
3. [ESG Landing Page (source for NAIC scenarios, documentation, etc.)](https://naic.conning.com/scenariofiles)