

**Valuation Actuary
Leading Practices**

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Meeting – Pinehurst, NC

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Valuation Actuary Leading Practices

TOPICS COVERED:

- **Lagging Practices (Crompton)**
- **Evolution of Leading Practices (Farrell)**
- **Actuarial Models (Farrell)**
- **Spreadsheets (Newby)**
- **Documentation (Newby)**
- **Controls (Newby)**
- **Other Risks (Crompton)**
- **Valuation Actuary Metrics (Crompton)**

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“A recurrent crisis should always have been foreseen.”

“A well run factory is a quiet factory.”

- Peter Drucker

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Lagging Practices

The Hall of Shame

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Lagging Practices – General Management Shortcomings

- Lack of Delegation
- Lack of Appropriate Training
- Lack of Proper Planning

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Lagging Practices – Some Control-Related Items

- Extensive Manual Procedures
- Numerous Data Hand-offs
- SOX Controls Done After Valuation Complete

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Lagging Practices – Spreadsheets

- Constants (Hard coded Values)
- Manual Recalculation
- Incorrect Algebraic Sign

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Lagging Practices – “Afterthought” Items

- Tax Reserves
- Reinsurance Reserve Adjustments

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Evolution of Leading Practices

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Evolution of Leading Practices

1980

- **A Different Environment**
- **Controls Were Loose**

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Evolution of Leading Practices

Fast Forward to 2012

- **Advances in Technology**
- **Product Differences**
- **More Guidance**
- **Actuarial Department Structures / Staffing**
- **SOX**

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Evolution of Leading Practices

Leading Practices in Valuation Have Evolved Slowly

- **Reliance On the "Black Box"**
- **Sparse Documentation**
- **Just Enough Controls to Satisfy SOX**

**Meanwhile, Rate of Change in the
"Outside World" Continues to
Accelerate**

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Actuarial Models

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Actuarial Models

Vision

- **Limited Actuarial Involvement to Run Q-End**
- **Strong Controls**
- **Easier to Meet Auditor's Needs**
- **More Time Reviewing & Less Time Doing**
- **Easier Access to Mainframe Computing Power**
- **Reduce Model Risk**

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Actuarial Models

Model Risk Factors

- Access
- Model Inputs
- Timeliness vs. Precision
- Model Fit
- Systemic Error
- Appropriateness
- Frequency
- Platform
- Dependencies

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Actuarial Models – Matrix of Model Dimensions vs. Model Management Practices

	Appropriateness	Expert Judgment	Controls	Testing	Documentation
Methodology					
Development					
Data					
Assumptions					
Validation of Results					
Use of Results					

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Actuarial Models

Actuarial Models

- **Back of an Envelope**
- **Spreadsheets**
- **Vendor Software on Desktop**
- **IT Actuarial Model**

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Actuarial Models

Development Leading Practices

- **Change Process**
- **Roles and Responsibilities**
- **Guiding Principles**
- **Commitments on Due Dates**
- **Separate Coding from Testing**
- **Coding Standards and Naming Conventions**
- **Output**

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Actuarial Models

Development Leading Practices (but wait, there's more)

- **The Golden Copy of Production**
- **Documentation**
- **Testing**
- **Review and Sign-off Processes**

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Actuarial Models

Production

- **Actuaries Set Assumptions & Review Results**
- **IT Does Everything In Between**
- **Post Quarter Meetings – How Did We Do?**

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Actuarial Models

Some Final Thoughts

- **Models & Modeling Are Dynamic Processes – For Most Models You Cannot “Set & Forget.”**
- **There Needs to Be Some Sort of Feedback/Improvement Loop For Model Improvements.**
- **Complex Products Imply Complex Models. The Cost of Complex Models Needs to Be Incorporated in Pricing Complex Products.**

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Spreadsheets

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More Spreadsheet Worst Practices

- **Hidden Fields**
- **Multiple Copies/Versions**
- **Extraneous Tabs**
- **Lack of Documentation**

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Leading Practices - Spreadsheets

- **Consistent scheme for Formatting Files**
 - Clearly Designated Input Area
 - Clearly Designated Output Area
 - Calc Button if Recalc is Manual
 - Macro buttons to Run Macros
 - Headers and Footers
 - Documentation Tab

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Leading Practices - Spreadsheets

- **Consistent scheme for naming files**
- **Consistent scheme for storing files**
 - Limited Access
 - Regular Backups
 - Version Control
- **Test and Peer Review**

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Spreadsheet Documentation

- **Purpose of Spreadsheet**
- **How to Use**
- **Sources of Input Data**
- **Owner / Designer**
- **List of Changes – what and when**
- **Assumptions**
- **Map of linkages**

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When is a spreadsheet a bad idea?

- **Mystery Macros**
- **Too Many Tabs**
- **Too Many Links to Other Spreadsheets**
- **Too Big to Email**
- **Lots of Database Functions**
- **Tries to do too much**

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Documentation

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Example of Bad Documentation

PLANCODE	COGNOUMINITS	SUMORINITS	SUMORSTATRESERVE	Rev per unit
AD01	100	5,258	48,550	7.21
AD02	109	7,403	34,350	4.64
AD03	112	13,930	66,472	4.76
AD04	2			
AD05	5	56	1,066	19.04
AD06	147	2,330	12,098	5.12
L1	5,451	57,479	128,915	2.24
L2	36	2,884	10,836	4.58
L4	11	143	47	0.33
L5	22	24	86	2.50
L6	31		423	13.70
L7	11		74	1.19
L8	11			0.8
L9	2			129.11
L10	2			144.27
L11	3			17
L12				
L13				
L14				
L15				1.00
L16				40.87
L17				5.50
W01				68.27
W02				52.86
W03				123.65
W04				623.13

Increase 50%!

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Example of Better Documentation

The 12/31/2011 statutory reserve for plan L1 was increased from 128,915 to 193,372 due to the correction of statutory interest rates from 5% to 3.5% for 2011 issues in Legacy system.

Corrected by: _____

Date: _____

Approved by: _____

Date: _____

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Principles of Good Documentation

- **Appropriate to the circumstances**
- **Take into account the intended users**
- **State purpose**
- **Be clear**
- **Explain what data was used**
- **Method and procedure explained**
- **Assumptions and source**
- **Evidence of review and sign-off**
- **Conclusion**

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Do

- **Include simple numeric examples**
- **Put details in appendix**
- **State the original number, the change, and the revised number**
- **Define acronyms**

Don't

- **Revise an earlier document by only stating the change**
- **Leave the reader wondering if a change was implemented or merely noted**
- **Leave a draft watermark on the final document**
- **State that a number is changing by x% without including what the starting and ending numbers are**
- **Leave sticky notes in files**

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Controls

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Required Framework for Controls

- SOX – all financial reports must include an internal control report
- Model Audit Rule – certain insurance companies must file a report with the state insurance department regarding its assessment of internal controls over financial reports
- Pronouncements from the PCAOB
- Actuarial Standards of Practice

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- Note:
- Required Controls are MINIMUM Standards, not Leading Practice

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Control Structures over Significant Items

- As a leading practice, controls should be:
- Customized to the item (ie reserve or DAC)
- Take into account risks particular to your company
- Take into account risks particular to the product
- Vary based on source of item (spreadsheet, vendor software)
- Vary based on volatility of item

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Other Risks

Key Person Risk

- **Good Documentation**
- **Training**

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Other Risks

Small Company Risk

- **General Lack of Resources & Training**
- **Strategic / Company Risks**

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Valuation Actuary Metrics

Usually in the form:

$$\text{Result} = \text{Output} / \text{Input}$$

Sometimes:

$$\text{Result} = \text{Raw Number}$$

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Valuation Actuary Metrics Brainstorming

INPUTS	OUTPUTS
Person-days	Unlocked DAC Schedules
Number of spreadsheets	Rollforwards
Number of computers	Control checklists
Lines of business	Cash flow testing reports
Staff headcount	Journal entries
Number of reinsurance treaties	Top side adjustments
Number of GMxB Benefits	Reconciliations
Number of legal entities	Reserve movement analysis
Number of meetings (ha, ha)	Management Information Reports

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**Valuation Actuary Metrics
A Humorous Sample Metric**

**DAC Schedules Unlocked per
Gallon of Coffee Consumed**

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Valuation Actuary Metrics

A Digression

(and maybe a rant!)

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Valuation Actuary Metrics

Some Sample Risk Metrics

- Number of valuation spreadsheets
- Number of top-side adjustments
- \$ Amount of top-side adjustments / Total Reserve (DAC)
- Days available for valuation / Number of lines of business
- Days spent reviewing / Days spent calculating & compiling

Model Risk - Some Model Complexity Metrics

- Number of systems
- Total lines of code (complexity risk)

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Valuation Actuary Metrics

Some Sample Performance Metrics

- Lines of business calculated (reserves, EV, etc) / person days
- Time to complete AG43 reserves / computers in network
- Manual reserve days
- Review & Analysis days

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