



IT-2: Property Risk Exposure Rating Options

CARe Seminar, June 4-5, 2018
Brooklyn, NY

Xingzhi (Shing) Wu, AXIS (moderator)

Don Yahalom, Verisk / ISO

Kevin Hilferty, Verisk / ISO *(for Steve White Guy Carpenter)*

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IT-2: Property Risk Exposure Rating Options



During this session we will cover a comprehensive introduction of rating elements, standard data collection, General Insurance Research Organization (GIRO) reference paper materials, and new PSOLD smoothed component pricing basics and implementation. Comparisons of various industry first loss scales, large policy analysis, actual vs. expected layer frequency testing and International ground-up and excess pricing extensions will be covered as well.

CARe INT-2 Property Risk Exposure Rating - Agenda



- **Introduction** [Shing-5]
- **Property Exposure Rating Overview*** [Kevin-25]
 - Rating methodologies
 - 1st loss scales
 - Issues such as premium allocation, occupancy definition, BI/TE
- **A Deeper Dive** [Don-25]
 - 1st loss scales additional background, definitions, comparisons and data sources
 - Sample high hazard application including large deductible / shared layering
 - Scale testing: actual vs expected layer frequency / return periods and COPE impacts
 - International ground-up and excess pricing
- **More Advanced Issues** [Kevin-15]
 - HPR Blending, Component, GIRO / Energy Working Party (2018/19)
- **Q&A** [5 minutes]

** Using materials from Steve White, Guy Carpenter*

To the extent there is time, will pause for questions after each of the main sections. Otherwise, will have questions at the end.



Property Per Risk A Deeper Dive





First Loss Scale Illustration

Linking Amount of Insurance to Loss Size for Layering



% of AOI	% of Loss
0.0%	0.0%
10.0%	40.0%
20.0%	50.0%
25.0%	60.0%
30.0%	65.0%
40.0%	70.0%
50.0%	75.0%
60.0%	80.0%
70.0%	85.0%
80.0%	90.0%
90.0%	96.0%
100.0%	100.0%

AOI = \$20,000,000 (insured value)

What is the charge for \$5M excess of \$5M?

- **Layer attachment point: $\$5M / \$20M = 25\%$; per scale, 60% of losses are less than or equal to 25% of AOI. Therefore, 60% of the total ground-up loss costs pays for losses related to the first \$5M of building value**
- **Layer limit: $\$10M / \$20M = 50\%$; per scale, 75% of the ground-up losses pays the losses for the first \$10M of building value**
- **Layer charge: would want to collect 15% (75.0%-60.0%) of the total ground-up expected loss costs for the \$5M excess of \$5M layer.**

Therefore, if the total expected losses for this building was \$40,000, then the amount for the excess layer would be \$6,000 (15% x \$40,000)



A Survey of Property Size of Loss Curves

Many different curves, with varying levels of credibility and transparency, have been used over the decades

- **The Issues:**

- Plausible curves need to rely on link between losses and their exposed amounts of insurance
- Curves vary substantially by Amount of Insurance, occupancy, peril, territory, etc.
- How are submission profiles produced and how are the curves applied – AOI, TIV, MPL, PML,...

- **Lloyd's Scales** (*World War II-unknown*)

- **Salzman Scales** (*1960 – personal property*)

- **Ludwig Tables** (*mid 1980s – one company HO and small CP*)

- **Various Reinsurer Based Scales**

- Swiss Re, Munich Re, Skandia, Frankona, Cologne Re, Employers Re, brokers,...

- **MBEFD Approximations** (*1990s - S. Bernegger*)

- Modeling loss severity with distributions from Physics (aka Swiss Re Y1 to Y4,...)

- **Extreme Value Theory** (*1990s- G. Ramachandran*)

- Factors affecting Fire Loss – Multiple regression models

- **ISO – PSOLD**

- First issued late 1990s
- Based on 25 years of collected premium and loss information that is linked to original AOI, etc.
- Uses over 50M individual policies, 235B ground-up losses, 38T AOI, 230 ISO class codes, 60 AOI bands up to 1B and 5M individual claims
- Now contains over 7M curves, including component curves by coverage / peril

Source: CS2 International Property – June 2013

Perspectives from America: The Missing link: Rating property exposure globally – May 2012 by John Buchanan



A Survey of Property Amount of Insurance Definitions

6.1 What Is Meant by Amount of Insurance

The exposure value is meant to represent the upper bound of the risk transferred, or the largest payment that the insurer or reinsurer would be required to make in response to a covered loss. However, the concept of AOI can represent many different amounts. The manner in which the exposure value is represented also often depends on how it is being used and on what questions are being investigated.

6.2 Varying Terminology: AOI, TIV, MPL, MFL, PML, SOV

A short-hand summary of the various definitions used for AOIs is shown in Figure 4.

Figure 4 - Reference List for AOI Definitions

Acronym	Short For:	Meaning
AOI TSI	Amount of Insurance Total Sum Insured	The amount of insurance (AOI) purchased, the policy limit, the total sum insured (TSI), or total insured value (TIV) (but TIV could have two meanings as below). Includes direct loss such as buildings and business personal property (contents), as well as indirect loss such as business interruption (also called time element). Different policy limits are typically purchased for buildings, contents, and business interruption.
TIV	Total Insured Values Or Total Insurable Values	Total Insured Values can be defined as the total AOI or policy limit. Or Total Insurable Values can be a reduction to the full AOI values and relates to the MPL and other estimated values. Statistically, buildings and contents are unlikely to suffer a total loss. The MFL, PML, EML, and NLE are all percentages less than the MPL. Estimating these values will depend on many variables specific to the risk including combustibility of the building, various COPE attributes and may include complex engineering scenarios with extensive exposure and loss simulations.
MPL	Maximum Possible Loss	The MPL is the maximum amount of loss possible . From a direct loss perspective, the MPL of a building and the business personal property (contents) within the building is 100% of the total values at risk which are measurable. From an indirect loss perspective, the MPL of business income can only be estimated because there is no definitive measure of the period of restoration (POR) following a worst-case, business closing loss. The MPL may be larger than the AOI or policy limits issued .
MFL	Maximum Foreseeable Loss	The MFL is the worst loss that is likely to occur if a key loss reduction system fails such as automatic fire alarms and sprinklers, watchman services, public fire suppression , etc.
PML	Probable Maximum Loss	The PML is an estimate of the largest loss the risk is likely to suffer when critical protection systems are functioning as expected and takes into account any relevant COPE attributes.
EML	Estimated Maximum Loss	The EML can and usually will ignore any particularly unlikely events or "remote coincidences" even if they are possible.
NLE	Normal Loss Expectancy	The NLE may assume that all active and passive protection systems and features are fully operating as expected under normal conditions.

Source: GIRO IFoA / CAS International Research Working Party - August 2017 (reprint)

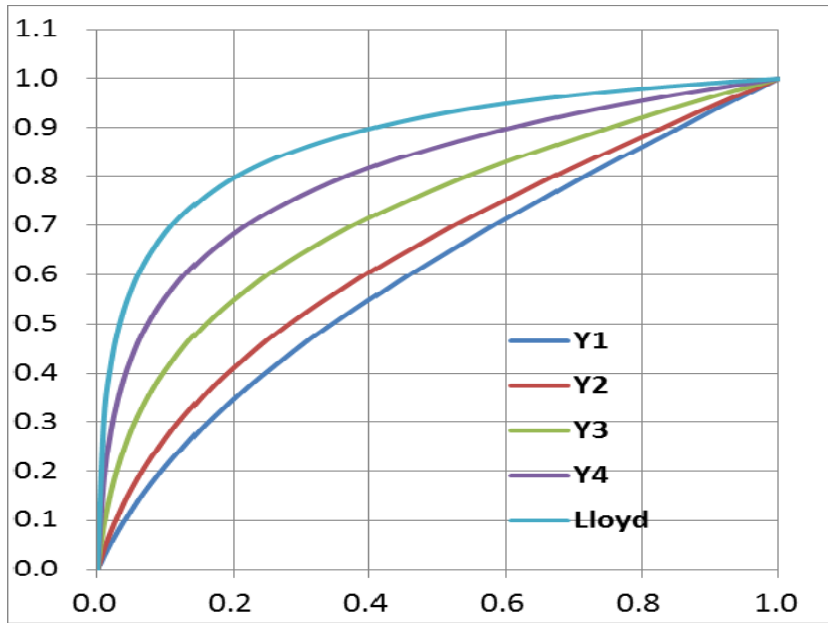
IFoA / CAS International Research Working Party - August 2017 (reprint)

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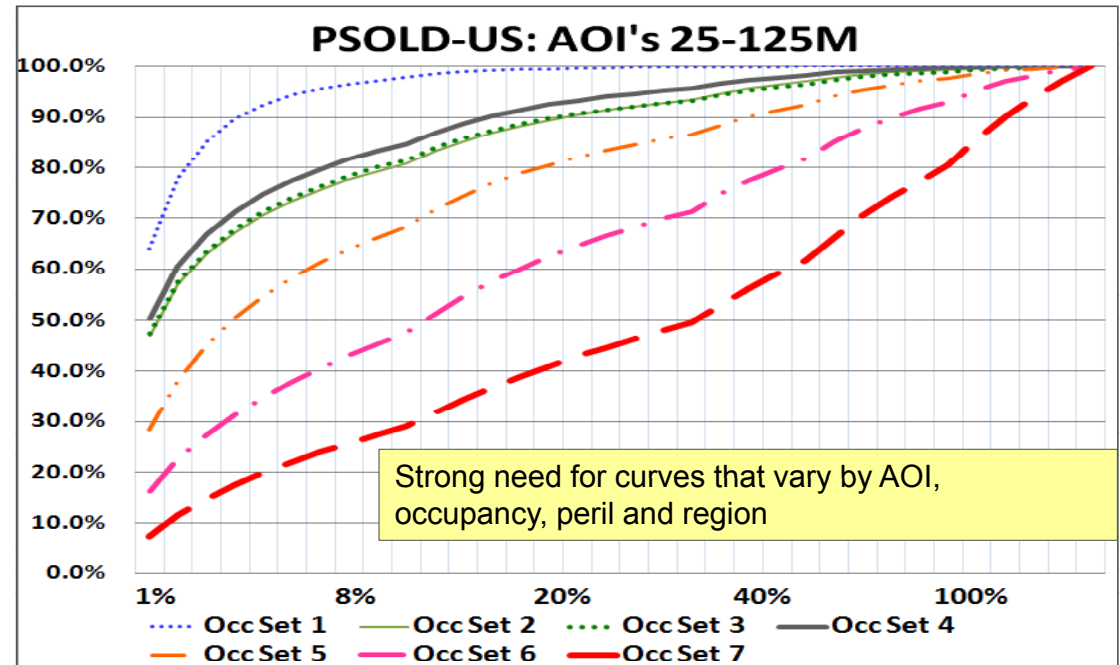


First Loss Scales Comparisons - Illustrative

Scales should vary by AOI, Occupancy, etc.



China Re-CPCR curve comparison MBBEFD
(Swiss Re Y1-Y4 parametric approximation)
Lloyd's empirical from unknown data source

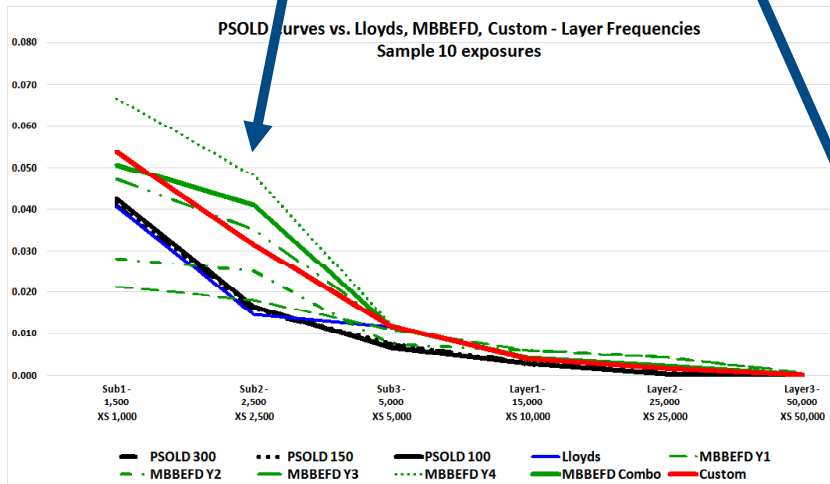


PSOLD uses over 5M individual linked losses and exposures to generate curves for 60 AOI bands, 38 occupancies, 4 sets of perils, 50 states, gross/net of deductible, etc.



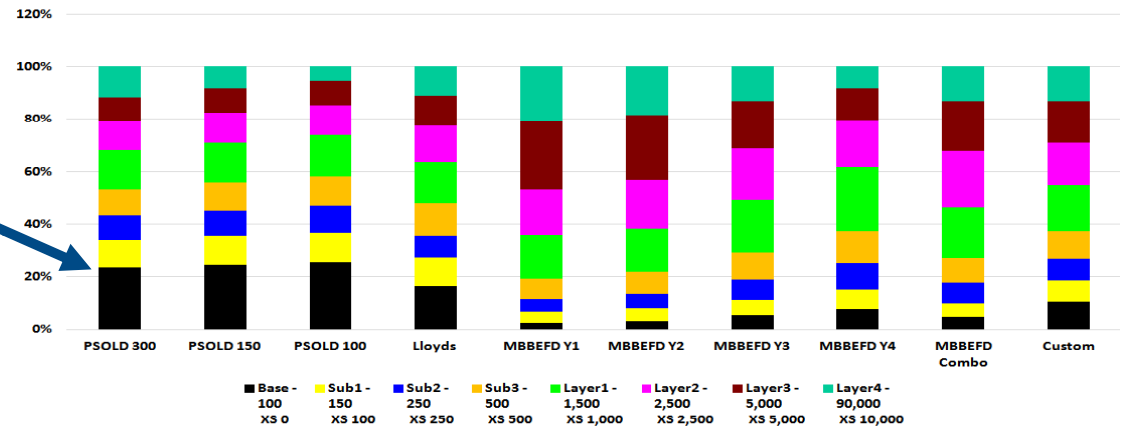
PSOLD layer results and frequencies can be compared to standard Lloyds and MBBEFD scales

PSOLD results respond significantly to differences in occupancy, AOI band, etc. Low hazard and high hazard exposures will have very different layer loss costs, unlike the standard curves. Also for validation of whatever curve is used, it is instructive to compare layer frequencies as well, and to the actual experience.

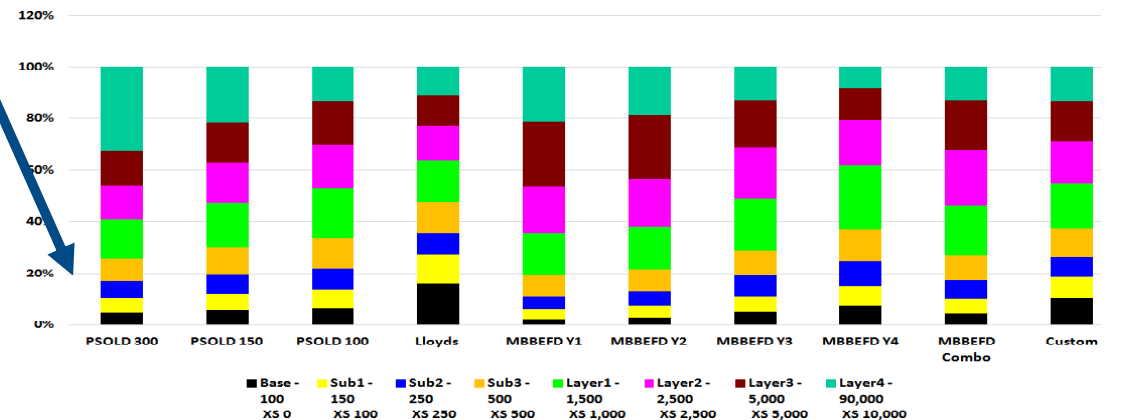


PSOLD Curves vs. Lloyds, MBBEFD, Custom
Sample exposures - Low AOIs - Low Hazard

Illustrative



PSOLD Curves vs. Lloyds, MBBEFD, Custom
Sample exposures - Low AOIs - High Hazard





Using ISO's base of over 50 million individual policies, 5 million individual claims, 235 billion estimated ground-up losses, from 230 CP class codes, we estimate ground-up loss costs and excess layering for 38 occupancy groups. Including for each of 7 various coverage and peril components.

Commercial:

- agricultural—greenhouses
- air/airplane hangars
- auto repair
- billboards
- churches
- emergency services
- entertainment and recreation
- gasoline stations
- government services
- hospitals and nursing homes
- hotels and motels—other
- hotels and motels—with restaurant
- offices and banks
- other mercantiles—other
- other mercantiles—retail/wholesale
- parking
- personal and repair services
- restaurants and bars
- schools

Manufacturing:

- agricultural—grain elevators
- buildings under construction
- chemical manufacturing
- food processing—other
- food processing—severe
- general industry/metal manufacturing
- heavy manufacturing—other
- heavy manufacturing—wood
- light manufacturing—other
- light manufacturing—printing
- severe manufacturing/petroleum
- storage

Highly Protected Risks:

- highly protected risks—low
- highly protected risks—medium
- highly protected risks—heavy

Residential:

- apartments/condos over 10 units
- apartments/condos under 10 units
- dwelling
- group institutional housing

ISO Rapid Valuator includes the following **coverages and peril** components:

- buildings—BG1 (fire)
- buildings—BG2 (wind)
- buildings—special causes of loss
- contents—BG1 (fire)
- contents—BG2 (wind)
- contents—special causes of loss
- business interruption (time element)



Std Lines

Non-Std Lines

HPR

Number Filed	PSOLD Rating		# of Policies	PSOLD Curve Fits: Gross Attritional		Estimated Total Gross Loss
	Group #	PSOLD Rating Group		Claims	Total Gross AOI	
4/6	1	Apartments/Condos under 10 Units	1,456,563	177,350	2,188,514,991,488	8,667,517,326
8/8	2	Apartments/Condos over 10 Units	1,108,575	182,545	4,475,899,827,489	13,809,526,596
3/4	3	Dwelling	3,670,104	101,306	502,319,606,306	6,172,130,440
3/3	4	Group Institutional Housing	22,194	4,282	27,175,764,331	158,293,793
2/2	5	Hospitals and Nursing Homes	290,925	92,053	1,313,198,374,560	4,978,212,056
4/4	6	Hotels and Motels - With Restaurant	111,833	32,000	549,499,840,918	3,029,847,303
7/7	7	Hotels and Motels - Other	676,147	112,348	704,382,561,595	4,835,980,728
13/14	8	Entertainment and Recreation	2,234,863	311,829	1,180,498,996,192	11,314,666,791
2/3	9	Restaurants and Bars	1,874,013	285,002	1,433,009,466,729	8,379,123,468
2/2	10	Emergency Services	468,334	87,054	1,997,950,832,459	2,823,535,858
1/1	11	Government Services	250,679	48,551	1,199,682,970,709	2,059,435,939
1/1	12	Churches	2,319,314	369,447	1,639,494,902,428	12,425,571,875
1/1	13	Schools	729,620	203,794	4,719,460,408,719	7,991,316,743
1/1	14	Offices and Banks	6,324,637	675,706	5,309,907,703,410	29,140,600,126
0/4	15	Other Mercantiles - Retail/Wholesale	1,288,735	156,276	1,172,406,451,416	8,674,743,903
17/17	16	Other Mercantiles - Other	12,163,707	824,102	3,443,301,869,294	32,019,918,262
1/1	17	Gasoline Stations	1,306,653	98,342	126,777,663,900	2,529,666,821
3/3	18	Auto Repair	2,323,011	202,611	731,690,566,894	7,978,928,652
1/1	19	Parking	780,748	74,687	173,388,031,531	1,665,873,572
0/1	20	Billboards	282,137	6,437	2,695,812,822	114,264,334
6/6	21	Personal and Repair Services	1,788,427	152,873	972,047,531,755	5,702,121,732
1/1	22	Buildings Under Construction	243,698	8,030	121,821,688,249	457,879,316
2/2	23	Airplane Risks	169,363	9,088	30,290,081,206	358,608,181
4/10	24	Storage	3,841,458	143,538	524,815,373,120	4,502,235,237
1/1	25	Agricultural - Greenhouses	90,834	5,888	16,403,456,444	234,628,914
0/6	26	Agricultural - Grain Elevators	46,900	22,556	124,270,144,380	1,644,710,697
3/7	27	Food Processing - Other	235,037	33,474	203,599,561,035	3,281,079,928
0/3	28	Food Processing - Severe	35,051	3,186	31,861,075,939	523,322,604
1/3	29	General Indu/Metal Manufacturing	1,327,155	145,344	1,116,015,426,226	9,878,754,933
0/5	30	Chemical Manufacturing	306,784	33,635	228,028,792,553	4,153,367,453
1/1	31	Light Manufacturing - Printing	205,324	25,778	111,085,097,756	1,114,529,689
2/5	32	Light Manufacturing - Other	201,938	22,194	145,544,632,592	2,267,674,644
0/4	33	Heavy Manufacturing - Wood	636,526	44,594	184,442,987,992	4,939,421,047
3/7	34	Heavy Manufacturing - Other	694,713	70,476	542,306,957,925	4,237,858,963
1/6	35	Severe Manu/Petroleum	18,685	7,947	97,670,982,847	4,091,707,567
0/17	36	Highly Protected Risks - Low	71,878	13,045	57,927,639,063	1,458,952,431
0/15	37	Highly Protected Risks - Medium	556,702	66,246	258,205,967,270	7,128,595,756
0/46	38	Highly Protected Risks - Heavy	250,059	47,412	185,119,645,537	10,768,656,579
99/229		Grand Total	52,411,324	5,181,188	38,002,713,685,168	235,513,340,263

Note: IRV 15 years # of policies and counts net of deductibles for E&S Customization (from 230 ISO CSPs)
 PSOLD - 24 years for ground-up curve fits (excluding minor cat); includes countrywide override



We have over 400,000 gross claims linked to AOIs larger than 10,000,000. With this information, including the underlying occupancy, coverage, and peril details, we produce over 7 million PSOLD first loss scales. We have different scales for each of the 60 AOI bands up to 1B, 38 occupancy groups, 7 coverage component, etc.

Our all-industry validation, indicates that our results are credible up to about 200-250M AOI.



Amount of Insurance (US\$)	PSOLD-2016 Cumulative Claim Counts by AOI	
	Net of Deductible	Gross of Deductible
Ground-Up	2,951,769	5,181,188
1,000,000	782,069	1,751,576
5,000,000	223,449	638,413
10,000,000	128,204	405,675
25,000,000	57,089	199,913
50,000,000	33,055	117,412
75,000,000	24,470	85,064
100,000,000	19,892	68,186
150,000,000	13,075	56,093
200,000,000	9,856	31,890

The above claim counts are total number of claims regardless of size, linked to the underlying AOI
 All policies and claims from 1991 to 2014; AOI's and claims are trended to 2017 for 2016 PSOLD
 All occupancies, states, non-cat perils combined (excluding both minor and major cat)
 Gross of deductible counts for ground-up curves use ISO's underlying deductible distributions



Layering Example 5 Risks / 4 Layers Each with Ground-up Loss Estimates

							Total AOI:	890,000,000	3,560,000,000	Deductible:	0	Total Gross LS:	720,523	2,882,090
Orig Sort	Country - Region	Description/Record Index	Building AOI (\$)	Contents AOI (\$)	Total B&C AOI (\$)	Time Element AOI (\$)	PSOLD: Syndication Entry Point	PSOLD: Syndication Exit Point	PSOLD: Syndication % Share	IRV Total Gross Loss Costs				
1	United States	Office - Layer 1	20,000,000	5,000,000	25,000,000	5,000,000	-	50,000,000	20.0%	18,513				
2	United States	Office - Layer 2	20,000,000	5,000,000	25,000,000	5,000,000	50,000,000	100,000,000	20.0%	18,513				
3	United States	Office - Layer 2	20,000,000	5,000,000	25,000,000	5,000,000	100,000,000	250,000,000	20.0%	18,513				
4	United States	Office - Layer 4	20,000,000	5,000,000	25,000,000	5,000,000	250,000,000	500,000,000	20.0%	18,513				
5	United States	Storage - Layer 1	30,000,000	20,000,000	50,000,000	10,000,000	-	50,000,000	20.0%	47,521				
6	United States	Storage - Layer 2	30,000,000	20,000,000	50,000,000	10,000,000	50,000,000	100,000,000	20.0%	47,521				
7	United States	Storage - Layer 3	30,000,000	20,000,000	50,000,000	10,000,000	100,000,000	250,000,000	20.0%	47,521				
8	United States	Storage - Layer 4	30,000,000	20,000,000	50,000,000	10,000,000	250,000,000	500,000,000	20.0%	47,521				
9	United States	Medium Manufacturing - Layer 1	150,000,000	50,000,000	200,000,000	50,000,000	-	50,000,000	20.0%	170,303				
10	United States	Medium Manufacturing - Layer 2	150,000,000	50,000,000	200,000,000	50,000,000	50,000,000	100,000,000	20.0%	170,303				
11	United States	Medium Manufacturing - Layer 3	150,000,000	50,000,000	200,000,000	50,000,000	100,000,000	250,000,000	20.0%	170,303				
12	United States	Medium Manufacturing - Layer 4	150,000,000	50,000,000	200,000,000	50,000,000	250,000,000	500,000,000	20.0%	170,303				
13	United States	High Hazard HPR - Layer 1	150,000,000	50,000,000	200,000,000	50,000,000	-	50,000,000	20.0%	142,550				
14	United States	High Hazard HPR - Layer 2	150,000,000	50,000,000	200,000,000	50,000,000	50,000,000	100,000,000	20.0%	142,550				
15	United States	High Hazard HPR - Layer 3	150,000,000	50,000,000	200,000,000	50,000,000	100,000,000	250,000,000	20.0%	142,550				
16	United States	High Hazard HPR - Layer 4	150,000,000	50,000,000	200,000,000	50,000,000	250,000,000	500,000,000	20.0%	142,550				
17	United States	Energy - Layer 1	200,000,000	50,000,000	250,000,000	50,000,000	-	50,000,000	20.0%	341,635				
18	United States	Energy - Layer 2	200,000,000	50,000,000	250,000,000	50,000,000	50,000,000	100,000,000	20.0%	341,635				
19	United States	Energy - Layer 3	200,000,000	50,000,000	250,000,000	50,000,000	100,000,000	250,000,000	20.0%	341,635				
20	United States	Energy - Layer 4	200,000,000	50,000,000	250,000,000	50,000,000	250,000,000	500,000,000	20.0%	341,635				



PSOLD Layering – Before Shares / Deductibles

Overwrite PSOLD Cap

Please Define the PSOLD Cap.

Note, if the PSOLD cap is altered PSOLD will need to be recalculated. Click the Calc Excess button below to recalculate. This will not change the general Percent Cap for PSOLD. This will only calculate PSOLD one time this way.

Experience Period (adj):	5.0							
Expected Claim Counts - Exper Period	0.33	0.20	0.08	0.04	0.04	0.02	0.01	
100.0%	37.5%	9.2%	13.9%	10.4%	2.8%	8.3%	14.4%	3.5%
Return Period:	15.1	25.1	59.7	120.8	140.3	214.6	748.7	
Layer Frequency:	0.066	0.040	0.017	0.008	0.007	0.005	0.001	

TOTALS		
20		\$ 3,560,000,000
ISO Rapid Valuator - Outputs		
Description/Record Index	Buildings + Content AOI	
1: Office - Layer 1	\$ 25,000,000	
2: Office - Layer 2	\$ 25,000,000	
3: Office - Layer 2	\$ 25,000,000	
4: Office - Layer 4	\$ 25,000,000	
5: Storage - Layer 1	\$ 50,000,000	
6: Storage - Layer 2	\$ 50,000,000	
7: Storage - Layer 3	\$ 50,000,000	
8: Storage - Layer 4	\$ 50,000,000	
9: Medium Manufacturing - Layer 1	\$ 200,000,000	
10: Medium Manufacturing - Layer 2	\$ 200,000,000	
11: Medium Manufacturing - Layer 3	\$ 200,000,000	
12: Medium Manufacturing - Layer 4	\$ 200,000,000	
13: High Hazard HPR - Layer 1	\$ 200,000,000	
14: High Hazard HPR - Layer 2	\$ 200,000,000	
15: High Hazard HPR - Layer 3	\$ 200,000,000	
16: High Hazard HPR - Layer 4	\$ 200,000,000	
17: Energy - Layer 1	\$ 250,000,000	
18: Energy - Layer 2	\$ 250,000,000	
19: Energy - Layer 3	\$ 250,000,000	
20: Energy - Layer 4	\$ 250,000,000	

Layer Deductible	
\$ 2,882,090	\$ 0
\$ 2,882,090	\$ 55,112,980
\$ -	\$ 2,755,649
\$ 2,755,649	\$ 2,755,649
PSOLD Input	PSOLD Output
PSOLD-Gross Attritional Losses	PSOLD-Net Attritional Losses
\$ 16,879	\$ 16,879
\$ 16,879	\$ 16,879
\$ 16,879	\$ 16,879
\$ 16,879	\$ 16,879
\$ 44,279	\$ 44,279
\$ 44,279	\$ 44,279
\$ 44,279	\$ 44,279
\$ 44,279	\$ 44,279
\$ 161,123	\$ 161,123
\$ 161,123	\$ 161,123
\$ 161,123	\$ 161,123
\$ 161,123	\$ 161,123
\$ 133,370	\$ 133,370
\$ 133,370	\$ 133,370
\$ 133,370	\$ 133,370
\$ 133,370	\$ 133,370
\$ 333,261	\$ 333,261
\$ 333,261	\$ 333,261
\$ 333,261	\$ 333,261
\$ 333,261	\$ 333,261

Participation Percentage (Using PSOLD detail results - All Years)

	100%	100%	100%	100%	100%	100%	100%
\$ 1,032,647	\$ 253,775	\$ 382,704	\$ 285,332	\$ 76,632	\$ 229,590	\$ 397,630	\$ 97,339
PSOLD Outputs - Attritlional (Layers in 000s)							
Base - 5,000 XS 0	Sub1 - 5,000 XS 5,000	Sub2 - 15,000 XS 10,000	Sub3 - 25,000 XS 25,000	Layer1 - 10,000 XS 50,000	Layer2 - 40,000 XS 60,000	Layer3 - 150,000 XS 100,000	Layer4 - 750,000 XS 250,000
\$ 14,281	\$ 1,316	\$ 972	\$ 309	\$ -	\$ -	\$ -	\$ -
\$ 14,281	\$ 1,316	\$ 972	\$ 309	\$ -	\$ -	\$ -	\$ -
\$ 14,281	\$ 1,316	\$ 972	\$ 309	\$ -	\$ -	\$ -	\$ -
\$ 14,281	\$ 1,316	\$ 972	\$ 309	\$ -	\$ -	\$ -	\$ -
\$ 32,796	\$ 3,694	\$ 3,906	\$ 2,392	\$ 562	\$ 929	\$ -	\$ -
\$ 32,796	\$ 3,694	\$ 3,906	\$ 2,392	\$ 562	\$ 929	\$ -	\$ -
\$ 32,796	\$ 3,694	\$ 3,906	\$ 2,392	\$ 562	\$ 929	\$ -	\$ -
\$ 32,796	\$ 3,694	\$ 3,906	\$ 2,392	\$ 562	\$ 929	\$ -	\$ -
\$ 123,824	\$ 14,851	\$ 14,750	\$ 5,514	\$ 695	\$ 1,044	\$ 436	\$ 8
\$ 123,824	\$ 14,851	\$ 14,750	\$ 5,514	\$ 695	\$ 1,044	\$ 436	\$ 8
\$ 123,824	\$ 14,851	\$ 14,750	\$ 5,514	\$ 695	\$ 1,044	\$ 436	\$ 8
\$ 123,824	\$ 14,851	\$ 14,750	\$ 5,514	\$ 695	\$ 1,044	\$ 436	\$ 8
\$ 26,064	\$ 12,951	\$ 22,356	\$ 18,161	\$ 5,092	\$ 15,708	\$ 28,017	\$ 5,022
\$ 26,064	\$ 12,951	\$ 22,356	\$ 18,161	\$ 5,092	\$ 15,708	\$ 28,017	\$ 5,022
\$ 26,064	\$ 12,951	\$ 22,356	\$ 18,161	\$ 5,092	\$ 15,708	\$ 28,017	\$ 5,022
\$ 26,064	\$ 12,951	\$ 22,356	\$ 18,161	\$ 5,092	\$ 15,708	\$ 28,017	\$ 5,022
\$ 61,196	\$ 30,632	\$ 53,691	\$ 44,957	\$ 12,810	\$ 39,717	\$ 70,954	\$ 19,304
\$ 61,196	\$ 30,632	\$ 53,691	\$ 44,957	\$ 12,810	\$ 39,717	\$ 70,954	\$ 19,304
\$ 61,196	\$ 30,632	\$ 53,691	\$ 44,957	\$ 12,810	\$ 39,717	\$ 70,954	\$ 19,304
\$ 61,196	\$ 30,632	\$ 53,691	\$ 44,957	\$ 12,810	\$ 39,717	\$ 70,954	\$ 19,304



PSOLD Layering – After Shares / Before Deductibles

TOTALS		Tot IRV value		Layer Deductible: \$0			Participation Percentage (Using PSOLD detail results - All Years)									
20		\$ 3,560,000,000		\$ 2,882,090	Att + Minor			100% 100% 100% 100% 100% 100% 100% 100%								
				\$ -	Major Cat			Check: \$ 2,755,649								
				\$ 2,755,649	\$ 126,441	Net after shares, partic, deductibles:			\$ 137,782							
ISO Rapid Valuator - Outputs		PSOLD Input	PSOLD Input				PSOLD Output	PSOLD Outputs - Attritional (Layers in 000s)								
Description/Record Index	Buildings + Content AOI	PSOLD-Gross Attritional Losses	PSOLD-Gross Minor Cat Losses	Entry Point	Exit Point	Percent Share	PSOLD-Net Attritional Losses	Base - 5,000 XS 0	Sub1 - 5,000 XS 5,000	Sub2 - 15,000 XS 10,000	Sub3 - 25,000 XS 25,000	Layer1 - 10,000 XS 50,000	Layer2 - 40,000 XS 60,000	Layer3 - 150,000 XS 100,000	Layer4 - 750,000 XS 250,000	
1: Office - Layer 1	\$ 25,000,000	\$ 16,879	\$ 1,634		\$ 50,000,000	20.0%	\$ 3,376	\$ 2,856	\$ 263	\$ 194	\$ 62	\$ -	\$ -	\$ -	\$ -	
2: Office - Layer 2	\$ 25,000,000	\$ 16,879	\$ 1,634	\$ 50,000,000	\$ 100,000,000	20.0%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
3: Office - Layer 2	\$ 25,000,000	\$ 16,879	\$ 1,634	\$ 100,000,000	\$ 250,000,000	20.0%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4: Office - Layer 4	\$ 25,000,000	\$ 16,879	\$ 1,634	\$ 250,000,000	\$ 500,000,000	20.0%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
5: Storage - Layer 1	\$ 50,000,000	\$ 44,279	\$ 3,243		\$ 50,000,000	20.0%	\$ 8,558	\$ 6,559	\$ 739	\$ 781	\$ 478	\$ -	\$ -	\$ -	\$ -	
6: Storage - Layer 2	\$ 50,000,000	\$ 44,279	\$ 3,243	\$ 50,000,000	\$ 100,000,000	20.0%	\$ 298	\$ -	\$ -	\$ -	\$ -	\$ 112	\$ 186	\$ -	\$ -	
7: Storage - Layer 3	\$ 50,000,000	\$ 44,279	\$ 3,243	\$ 100,000,000	\$ 250,000,000	20.0%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
8: Storage - Layer 4	\$ 50,000,000	\$ 44,279	\$ 3,243	\$ 250,000,000	\$ 500,000,000	20.0%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
9: Medium Manufacturing - Layer 1	\$ 200,000,000	\$ 161,123	\$ 9,180		\$ 50,000,000	20.0%	\$ 31,788	\$ 24,765	\$ 2,970	\$ 2,950	\$ 1,103	\$ -	\$ -	\$ -	\$ -	
10: Medium Manufacturing - Layer 2	\$ 200,000,000	\$ 161,123	\$ 9,180	\$ 50,000,000	\$ 100,000,000	20.0%	\$ 348	\$ -	\$ -	\$ -	\$ -	\$ 139	\$ 209	\$ -	\$ -	
11: Medium Manufacturing - Layer 3	\$ 200,000,000	\$ 161,123	\$ 9,180	\$ 100,000,000	\$ 250,000,000	20.0%	\$ 87	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 87	\$ -	
12: Medium Manufacturing - Layer 4	\$ 200,000,000	\$ 161,123	\$ 9,180	\$ 250,000,000	\$ 500,000,000	20.0%	\$ 2	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2	
13: High Hazard HPR - Layer 1	\$ 200,000,000	\$ 133,370	\$ 9,180		\$ 50,000,000	20.0%	\$ 15,806	\$ 5,213	\$ 2,500	\$ 4,121	\$ 3,012	\$ -	\$ -	\$ -	\$ -	
14: High Hazard HPR - Layer 2	\$ 200,000,000	\$ 133,370	\$ 9,180	\$ 50,000,000	\$ 100,000,000	20.0%	\$ 4,160	\$ -	\$ -	\$ -	\$ -	\$ 1,018	\$ 3,142	\$ -	\$ -	
15: High Hazard HPR - Layer 3	\$ 200,000,000	\$ 133,370	\$ 9,180	\$ 100,000,000	\$ 250,000,000	20.0%	\$ 5,603	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 5,603	\$ -	
16: High Hazard HPR - Layer 4	\$ 200,000,000	\$ 133,370	\$ 9,180	\$ 250,000,000	\$ 500,000,000	20.0%	\$ 1,004	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,004	
17: Energy - Layer 1	\$ 250,000,000	\$ 333,261	\$ 8,374		\$ 50,000,000	20.0%	\$ 37,934	\$ 12,187	\$ 6,100	\$ 10,693	\$ 8,953	\$ -	\$ -	\$ -	\$ -	
18: Energy - Layer 2	\$ 250,000,000	\$ 333,261	\$ 8,374	\$ 50,000,000	\$ 100,000,000	20.0%	\$ 10,461	\$ -	\$ -	\$ -	\$ -	\$ 2,551	\$ 7,910	\$ -	\$ -	
19: Energy - Layer 3	\$ 250,000,000	\$ 333,261	\$ 8,374	\$ 100,000,000	\$ 250,000,000	20.0%	\$ 14,131	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 14,131	\$ -	
20: Energy - Layer 4	\$ 250,000,000	\$ 333,261	\$ 8,374	\$ 250,000,000	\$ 500,000,000	20.0%	\$ 4,127	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,127	



PSOLD Layering – After Shares / After \$10M Policy Deductible

TOTALS				Layer Deductible: \$0			Participation Percentage (Using PSOLD detail results - All Years)								
20	\$ 3,560,000,000	\$ 2,882,090	Tot IRV value				0%	0%	100%	100%	100%	100%	100%	100%	
		\$ 2,882,090	Att + Minor				\$ 51,580	\$ 12,663	\$ 19,090	\$ 14,229	\$ 3,821	\$ 11,446	\$ 19,821	\$ 5,133	
		\$ -	Major Cat				PSOLD Outputs - Attritional (Layers in 600s)								
		\$ 2,755,649	\$ 126,441	Net after shares, partic, deductibles:			Base - 5,000 XS 0	Sub1 - 5,000 XS 5,000	Sub2 - 15,000 XS 10,000	Sub3 - 25,000 XS 25,000	Layer 1 - 10,000 XS 50,000	Layer 2 - 40,000 XS 60,000	Layer 3 - 150,000 XS 100,000	Layer 4 - 750,000 XS 250,000	
ISO Rapid Valuator - Outputs		PSOLD Input	PSOLD Input	PSOLD Output											
Description/Record Index	Buildings + Content AOI	PSOLD Gross Attritional Losses	PSOLD Gross Minor Cat Losses	Entry Point	Exit Point	Percent Share	PSOLD-Net Attritional Losses								
1: Office - Layer 1	\$ 25,000,000	\$ 16,879	\$ 1,634	\$ 50,000,000	\$ 50,000,000	20.0%	\$ 256	\$ 2,856	\$ 263	\$ 194	\$ 62	\$ -	\$ -	\$ -	\$ -
2: Office - Layer 2	\$ 25,000,000	\$ 16,879	\$ 1,634	\$ 50,000,000	\$ 100,000,000	20.0%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
3: Office - Layer 2	\$ 25,000,000	\$ 16,879	\$ 1,634	\$ 100,000,000	\$ 250,000,000	20.0%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
4: Office - Layer 4	\$ 25,000,000	\$ 16,879	\$ 1,634	\$ 250,000,000	\$ 500,000,000	20.0%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
5: Storage - Layer 1	\$ 50,000,000	\$ 44,279	\$ 3,243	\$ 50,000,000	\$ 50,000,000	20.0%	\$ 1,260	\$ 6,559	\$ 739	\$ 781	\$ 478	\$ -	\$ -	\$ -	\$ -
6: Storage - Layer 2	\$ 50,000,000	\$ 44,279	\$ 3,243	\$ 50,000,000	\$ 100,000,000	20.0%	\$ 298	\$ -	\$ -	\$ -	\$ 112	\$ 186	\$ -	\$ -	\$ -
7: Storage - Layer 3	\$ 50,000,000	\$ 44,279	\$ 3,243	\$ 100,000,000	\$ 250,000,000	20.0%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
8: Storage - Layer 4	\$ 50,000,000	\$ 44,279	\$ 3,243	\$ 250,000,000	\$ 500,000,000	20.0%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
9: Medium Manufacturing - Layer 1	\$ 200,000,000	\$ 161,123	\$ 9,180	\$ 50,000,000	\$ 50,000,000	20.0%	\$ 4,053	\$ 24,765	\$ 2,970	\$ 2,950	\$ 1,103	\$ -	\$ -	\$ -	\$ -
10: Medium Manufacturing - Layer 2	\$ 200,000,000	\$ 161,123	\$ 9,180	\$ 50,000,000	\$ 100,000,000	20.0%	\$ 348	\$ -	\$ -	\$ -	\$ 139	\$ 209	\$ -	\$ -	\$ -
11: Medium Manufacturing - Layer 3	\$ 200,000,000	\$ 161,123	\$ 9,180	\$ 100,000,000	\$ 250,000,000	20.0%	\$ 87	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 87	\$ -	\$ -
12: Medium Manufacturing - Layer 4	\$ 200,000,000	\$ 161,123	\$ 9,180	\$ 250,000,000	\$ 500,000,000	20.0%	\$ 2	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2
13: High Hazard HPR - Layer 1	\$ 200,000,000	\$ 133,370	\$ 9,180	\$ 50,000,000	\$ 50,000,000	20.0%	\$ 8,103	\$ 5,213	\$ 2,590	\$ 4,471	\$ 3,632	\$ -	\$ -	\$ -	\$ -
14: High Hazard HPR - Layer 2	\$ 200,000,000	\$ 133,370	\$ 9,180	\$ 50,000,000	\$ 100,000,000	20.0%	\$ 4,100	\$ -	\$ -	\$ -	\$ 1,010	\$ 3,142	\$ -	\$ -	\$ -
15: High Hazard HPR - Layer 3	\$ 200,000,000	\$ 133,370	\$ 9,180	\$ 100,000,000	\$ 250,000,000	20.0%	\$ 5,603	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 5,603	\$ -	\$ -
16: High Hazard HPR - Layer 4	\$ 200,000,000	\$ 133,370	\$ 9,180	\$ 250,000,000	\$ 500,000,000	20.0%	\$ 1,004	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,004
17: Energy - Layer 1	\$ 250,000,000	\$ 333,261	\$ 8,374	\$ 50,000,000	\$ 50,000,000	20.0%	\$ 19,646	\$ 12,187	\$ 6,100	\$ 10,693	\$ 8,953	\$ -	\$ -	\$ -	\$ -
18: Energy - Layer 2	\$ 250,000,000	\$ 333,261	\$ 8,374	\$ 50,000,000	\$ 100,000,000	20.0%	\$ 10,461	\$ -	\$ -	\$ -	\$ 2,551	\$ 7,910	\$ -	\$ -	\$ -
19: Energy - Layer 3	\$ 250,000,000	\$ 333,261	\$ 8,374	\$ 100,000,000	\$ 250,000,000	20.0%	\$ 14,131	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 14,131	\$ -	\$ -
20: Energy - Layer 4	\$ 250,000,000	\$ 333,261	\$ 8,374	\$ 250,000,000	\$ 500,000,000	20.0%	\$ 4,127	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,127



Layering Example 5 Risks / 4 Layers – Including \$10M per Layer Deductible

Total AOI: 890,000,000 3,560,000,000 Deductible: 10,000,000 Total Gross LS: 720,523 2,882,090 66,854

Orig Sort	Country - Region	Description/Record Index	Building AOI (\$)	Contents AOI (\$)	Total B&C AOI (\$)	Time Element AOI (\$)	PSOLD: Syndication Entry Point	PSOLD: Syndication Exit Point	PSOLD: Syndication % Share	IRV Total Gross Loss Costs	PSOLD: Net Attritional
1	United States	Office - Layer 1	20,000,000	5,000,000	25,000,000	5,000,000	10,000,000	50,000,000	20.0%	18,513	256
2	United States	Office - Layer 2	20,000,000	5,000,000	25,000,000	5,000,000	60,000,000	100,000,000	20.0%	18,513	-
3	United States	Office - Layer 2	20,000,000	5,000,000	25,000,000	5,000,000	110,000,000	250,000,000	20.0%	18,513	-
4	United States	Office - Layer 4	20,000,000	5,000,000	25,000,000	5,000,000	260,000,000	500,000,000	20.0%	18,513	-
5	United States	Storage - Layer 1	30,000,000	20,000,000	50,000,000	10,000,000	10,000,000	50,000,000	20.0%	47,521	1,260
6	United States	Storage - Layer 2	30,000,000	20,000,000	50,000,000	10,000,000	60,000,000	100,000,000	20.0%	47,521	186
7	United States	Storage - Layer 3	30,000,000	20,000,000	50,000,000	10,000,000	110,000,000	250,000,000	20.0%	47,521	-
8	United States	Storage - Layer 4	30,000,000	20,000,000	50,000,000	10,000,000	260,000,000	500,000,000	20.0%	47,521	-
9	United States	Medium Manufacturing - Layer 1	150,000,000	50,000,000	200,000,000	50,000,000	10,000,000	50,000,000	20.0%	170,303	4,053
10	United States	Medium Manufacturing - Layer 2	150,000,000	50,000,000	200,000,000	50,000,000	60,000,000	100,000,000	20.0%	170,303	209
11	United States	Medium Manufacturing - Layer 3	150,000,000	50,000,000	200,000,000	50,000,000	110,000,000	250,000,000	20.0%	170,303	66
12	United States	Medium Manufacturing - Layer 4	150,000,000	50,000,000	200,000,000	50,000,000	260,000,000	500,000,000	20.0%	170,303	1
13	United States	High Hazard HPR - Layer 1	150,000,000	50,000,000	200,000,000	50,000,000	10,000,000	50,000,000	20.0%	142,550	8,103
14	United States	High Hazard HPR - Layer 2	150,000,000	50,000,000	200,000,000	50,000,000	60,000,000	100,000,000	20.0%	142,550	3,142
15	United States	High Hazard HPR - Layer 3	150,000,000	50,000,000	200,000,000	50,000,000	110,000,000	250,000,000	20.0%	142,550	4,977
16	United States	High Hazard HPR - Layer 4	150,000,000	50,000,000	200,000,000	50,000,000	260,000,000	500,000,000	20.0%	142,550	823
17	United States	Energy - Layer 1	200,000,000	50,000,000	250,000,000	50,000,000	10,000,000	50,000,000	20.0%	341,635	19,646
18	United States	Energy - Layer 2	200,000,000	50,000,000	250,000,000	50,000,000	60,000,000	100,000,000	20.0%	341,635	7,910
19	United States	Energy - Layer 3	200,000,000	50,000,000	250,000,000	50,000,000	110,000,000	250,000,000	20.0%	341,635	12,552
20	United States	Energy - Layer 4	200,000,000	50,000,000	250,000,000	50,000,000	260,000,000	500,000,000	20.0%	341,635	3,670



PSOLD Layering – After Shares / After \$10M Per Layer Deductible

TOTALS		\$ 2,882,090	Tot IRV value	Layer Deductible: \$10,000,000			Participation Percentage (Using PSOLD detail results - All Years)							
20	\$ 3,560,000,000	\$ 2,882,090	Att + Minor	Check: \$ 1,337,075			100%	100%	100%	100%	100%	100%	100%	100%
ISO Rapid Valuator - Outputs		\$ -	Major Cat	Net after shares, partic, deductibles: \$ 66,854			\$ -	\$ -	\$19,090	\$14,229	\$ -	\$11,446	\$ 17,596	\$ 4,494
Description/Record Index	Buildings + Content AOI	PSOLD Input	PSOLD Input	Entry Point	Exit Point	Percent Share	PSOLD Output	PSOLD Outputs - Attritional (Layers in 000s)						
		PSOLD-Gross Attritional Losses	PSOLD-Gross Minor Cat Losses				PSOLD-Net Attritional Losses	Base - 5,000 XS 0	Sub1 - 5,000 XS 5,000	Sub2 - 5,000 XS 10,000	Sub3 - 25,000 XS 25,000	Layer1 - 10,000 XS 50,000	Layer2 - 60,000 XS 100,000	Layer3 - 150,000 XS 100,000
1: Office - Layer 1	\$ 25,000,000	\$ 16,879	\$ 1,634	\$ 10,000,000	\$ 50,000,000	20.0%	\$ 256	\$ -	\$ -	\$ 194	\$ 62	\$ -	\$ -	\$ -
2: Office - Layer 2	\$ 25,000,000	\$ 16,879	\$ 1,634	\$ 60,000,000	\$100,000,000	20.0%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
3: Office - Layer 2	\$ 25,000,000	\$ 16,879	\$ 1,634	\$ 110,000,000	\$250,000,000	20.0%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
4: Office - Layer 4	\$ 25,000,000	\$ 16,879	\$ 1,634	\$ 260,000,000	\$500,000,000	20.0%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
5: Storage - Layer 1	\$ 50,000,000	\$ 44,279	\$ 3,243	\$ 10,000,000	\$ 50,000,000	20.0%	\$ 1,260	\$ -	\$ -	\$ 781	\$ 476	\$ -	\$ -	\$ -
6: Storage - Layer 2	\$ 50,000,000	\$ 44,279	\$ 3,243	\$ 60,000,000	\$100,000,000	20.0%	\$ 186	\$ -	\$ -	\$ -	\$ -	\$ 186	\$ -	\$ -
7: Storage - Layer 3	\$ 50,000,000	\$ 44,279	\$ 3,243	\$ 110,000,000	\$250,000,000	20.0%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
8: Storage - Layer 4	\$ 50,000,000	\$ 44,279	\$ 3,243	\$ 260,000,000	\$500,000,000	20.0%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
9: Medium Manufacturing - Layer 1	\$ 200,000,000	\$ 161,123	\$ 9,180	\$ 10,000,000	\$ 50,000,000	20.0%	\$ 4,053	\$ -	\$ -	\$ 950	\$ 1,103	\$ -	\$ -	\$ -
10: Medium Manufacturing - Layer 2	\$ 200,000,000	\$ 161,123	\$ 9,180	\$ 60,000,000	\$100,000,000	20.0%	\$ 209	\$ -	\$ -	\$ -	\$ -	\$ 209	\$ -	\$ -
11: Medium Manufacturing - Layer 3	\$ 200,000,000	\$ 161,123	\$ 9,180	\$ 110,000,000	\$250,000,000	20.0%	\$ 66	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 66	\$ -
12: Medium Manufacturing - Layer 4	\$ 200,000,000	\$ 161,123	\$ 9,180	\$ 260,000,000	\$500,000,000	20.0%	\$ 1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1
13: High Hazard HPR - Layer 1	\$ 200,000,000	\$ 133,370	\$ 9,180	\$ 10,000,000	\$ 50,000,000	20.0%	\$ 8,103	\$ -	\$ -	\$ 4,471	\$ 3,632	\$ -	\$ -	\$ -
14: High Hazard HPR - Layer 2	\$ 200,000,000	\$ 133,370	\$ 9,180	\$ 60,000,000	\$100,000,000	20.0%	\$ 3,142	\$ -	\$ -	\$ -	\$ -	\$ 3,142	\$ -	\$ -
15: High Hazard HPR - Layer 3	\$ 200,000,000	\$ 133,370	\$ 9,180	\$ 110,000,000	\$250,000,000	20.0%	\$ 4,977	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,977	\$ -
16: High Hazard HPR - Layer 4	\$ 200,000,000	\$ 133,370	\$ 9,180	\$ 260,000,000	\$500,000,000	20.0%	\$ 823	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 823
17: Energy - Layer 1	\$ 250,000,000	\$ 333,261	\$ 8,374	\$ 10,000,000	\$ 50,000,000	20.0%	\$ 19,646	\$ -	\$ -	\$ 10,693	\$ 8,953	\$ -	\$ -	\$ -
18: Energy - Layer 2	\$ 250,000,000	\$ 333,261	\$ 8,374	\$ 60,000,000	\$100,000,000	20.0%	\$ 7,910	\$ -	\$ -	\$ -	\$ -	\$ 7,910	\$ -	\$ -
19: Energy - Layer 3	\$ 250,000,000	\$ 333,261	\$ 8,374	\$ 110,000,000	\$250,000,000	20.0%	\$ 12,552	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 12,552	\$ -
20: Energy - Layer 4	\$ 250,000,000	\$ 333,261	\$ 8,374	\$ 260,000,000	\$500,000,000	20.0%	\$ 3,670	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,670



PSOLD Layering – After Shares / After \$25M Per Layer Deductible

TOTALS		\$ 2,882,090	Tot IRV value	Layer Deductible: \$25,000,000			Participation Percentage (Using PSOLD detail results - All Years)								
20	\$ 3,560,000,000	\$ 2,882,090	Att - Minor	Check: \$ 780,275			100%	100%	100%	100%	100%	100%	100%	100%	
ISO Rapid Valuator - Outputs		\$ -	Major Cat	Net after shares, partic, deductibles: \$ 39,014			\$ -	\$ -	\$ -	\$ 14,229	\$ -	\$ 6,563	\$ 14,593	\$ 3,629	
Description/Record Index	Buildings + Content AOI	PSOLD Input	PSOLD Input	Entry Point	Exit Point	Percent Share	PSOLD-Net Attritional Losses	Base - \$0	Sub1 - \$5,000	Sub2 - \$15,000	Sub3 - \$25,000	Layer1 - \$50,000	Layer2 - \$60,000	Layer3 - \$100,000	Layer4 - \$250,000
PSOLD-Gross Attritional Losses	PSOLD-Gross Minor Cat Losses														
1: Office - Layer 1	\$ 25,000,000	\$ 16,879	\$ 1,634	\$ 25,000,000	\$ 50,000,000	20.0%	\$ 62	\$ -	\$ -	\$ -	\$ 62	\$ -	\$ -	\$ -	\$ -
2: Office - Layer 2	\$ 25,000,000	\$ 16,879	\$ 1,634	\$ 75,000,000	\$ 100,000,000	20.0%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
3: Office - Layer 2	\$ 25,000,000	\$ 16,879	\$ 1,634	\$ 125,000,000	\$ 250,000,000	20.0%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
4: Office - Layer 4	\$ 25,000,000	\$ 16,879	\$ 1,634	\$ 275,000,000	\$ 500,000,000	20.0%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
5: Storage - Layer 1	\$ 50,000,000	\$ 44,279	\$ 3,243	\$ 25,000,000	\$ 50,000,000	20.0%	\$ 478	\$ -	\$ -	\$ -	\$ 478	\$ -	\$ -	\$ -	\$ -
6: Storage - Layer 2	\$ 50,000,000	\$ 44,279	\$ 3,243	\$ 75,000,000	\$ 100,000,000	20.0%	\$ 56	\$ -	\$ -	\$ -	\$ -	\$ 56	\$ -	\$ -	\$ -
7: Storage - Layer 3	\$ 50,000,000	\$ 44,279	\$ 3,243	\$ 125,000,000	\$ 250,000,000	20.0%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
8: Storage - Layer 4	\$ 50,000,000	\$ 44,279	\$ 3,243	\$ 275,000,000	\$ 500,000,000	20.0%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
9: Medium Manufacturing - Layer 1	\$ 200,000,000	\$ 161,123	\$ 9,180	\$ 25,000,000	\$ 50,000,000	20.0%	\$ 1,103	\$ -	\$ -	\$ -	\$ 1,103	\$ -	\$ -	\$ -	\$ -
10: Medium Manufacturing - Layer 2	\$ 200,000,000	\$ 161,123	\$ 9,180	\$ 75,000,000	\$ 100,000,000	20.0%	\$ 93	\$ -	\$ -	\$ -	\$ -	\$ 93	\$ -	\$ -	\$ -
11: Medium Manufacturing - Layer 3	\$ 200,000,000	\$ 161,123	\$ 9,180	\$ 125,000,000	\$ 250,000,000	20.0%	\$ 44	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 44	\$ -	\$ -
12: Medium Manufacturing - Layer 4	\$ 200,000,000	\$ 161,123	\$ 9,180	\$ 275,000,000	\$ 500,000,000	20.0%	\$ 1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1
13: High Hazard HPR - Layer 1	\$ 200,000,000	\$ 133,370	\$ 9,180	\$ 25,000,000	\$ 50,000,000	20.0%	\$ 3,632	\$ -	\$ -	\$ -	\$ 3,632	\$ -	\$ -	\$ -	\$ -
14: High Hazard HPR - Layer 2	\$ 200,000,000	\$ 133,370	\$ 9,180	\$ 75,000,000	\$ 100,000,000	20.0%	\$ 1,822	\$ -	\$ -	\$ -	\$ -	\$ 1,822	\$ -	\$ -	\$ -
15: High Hazard HPR - Layer 3	\$ 200,000,000	\$ 133,370	\$ 9,180	\$ 125,000,000	\$ 250,000,000	20.0%	\$ 4,131	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,131	\$ -	\$ -
16: High Hazard HPR - Layer 4	\$ 200,000,000	\$ 133,370	\$ 9,180	\$ 275,000,000	\$ 500,000,000	20.0%	\$ 578	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 578
17: Energy - Layer 1	\$ 250,000,000	\$ 333,261	\$ 8,374	\$ 25,000,000	\$ 50,000,000	20.0%	\$ 8,953	\$ -	\$ -	\$ -	\$ 8,953	\$ -	\$ -	\$ -	\$ -
18: Energy - Layer 2	\$ 250,000,000	\$ 333,261	\$ 8,374	\$ 75,000,000	\$ 100,000,000	20.0%	\$ 4,593	\$ -	\$ -	\$ -	\$ -	\$ 4,593	\$ -	\$ -	\$ -
19: Energy - Layer 3	\$ 250,000,000	\$ 333,261	\$ 8,374	\$ 125,000,000	\$ 250,000,000	20.0%	\$ 10,418	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 10,418	\$ -	\$ -
20: Energy - Layer 4	\$ 250,000,000	\$ 333,261	\$ 8,374	\$ 275,000,000	\$ 500,000,000	20.0%	\$ 3,051	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,051



Layering Example – Lloyds – Before Shares / Deductibles

Display Components

Select CAT Treatment

Attritional
 Minor CAT

Select PSOLD Curve

Stable (All Years)
 Responsive (5 Years)

Select Coverage

Buildings
 Contents
 Time Element

Select Peril

BG1
 BG2
 SCL

All Components-PSOLD

Select Layer Source

PSOLD
 Lloyds
 MBBEFD (Y1-Y4)
 Custom

TOTALS			\$ 2,882,090	Layer Deductible
20		\$ 3,560,000,000	\$ 2,882,090	\$0
			\$ -	\$ 55,112,980
			\$ 2,755,649	\$ 2,755,649
ISO Rapid Valuator - Outputs				
Description/Record Index	Buildings + Content AOI	PSOLD Gross Attritional Losses	PSOLD Input	PSOLD Output
1: Office - Layer 1	\$ 25,000,000	\$ 16,879	\$ 16,879	\$ 16,879
2: Office - Layer 2	\$ 25,000,000	\$ 16,879	\$ 16,879	\$ 16,879
3: Office - Layer 2	\$ 25,000,000	\$ 16,879	\$ 16,879	\$ 16,879
4: Office - Layer 4	\$ 25,000,000	\$ 16,879	\$ 16,879	\$ 16,879
5: Storage - Layer 1	\$ 50,000,000	\$ 44,279	\$ 44,279	\$ 44,279
6: Storage - Layer 2	\$ 50,000,000	\$ 44,279	\$ 44,279	\$ 44,279
7: Storage - Layer 3	\$ 50,000,000	\$ 44,279	\$ 44,279	\$ 44,279
8: Storage - Layer 4	\$ 50,000,000	\$ 44,279	\$ 44,279	\$ 44,279
9: Medium Manufacturing - Layer 1	\$ 200,000,000	\$ 161,123	\$ 161,123	\$ 161,123
10: Medium Manufacturing - Layer 2	\$ 200,000,000	\$ 161,123	\$ 161,123	\$ 161,123
11: Medium Manufacturing - Layer 3	\$ 200,000,000	\$ 161,123	\$ 161,123	\$ 161,123
12: Medium Manufacturing - Layer 4	\$ 200,000,000	\$ 161,123	\$ 161,123	\$ 161,123
13: High Hazard HPR - Layer 1	\$ 200,000,000	\$ 133,370	\$ 133,370	\$ 133,370
14: High Hazard HPR - Layer 2	\$ 200,000,000	\$ 133,370	\$ 133,370	\$ 133,370
15: High Hazard HPR - Layer 3	\$ 200,000,000	\$ 133,370	\$ 133,370	\$ 133,370
16: High Hazard HPR - Layer 4	\$ 200,000,000	\$ 133,370	\$ 133,370	\$ 133,370
17: Energy - Layer 1	\$ 250,000,000	\$ 333,261	\$ 333,261	\$ 333,261
18: Energy - Layer 2	\$ 250,000,000	\$ 333,261	\$ 333,261	\$ 333,261
19: Energy - Layer 3	\$ 250,000,000	\$ 333,261	\$ 333,261	\$ 333,261
20: Energy - Layer 4	\$ 250,000,000	\$ 333,261	\$ 333,261	\$ 333,261

Participation Percentage (Using PSOLD detail results - All Years)

	100%	100%	100%	100%	100%	100%	100%	
\$	862,541	\$ 297,010	\$ 443,960	\$ 352,980	\$ 103,727	\$ 218,366	\$ 477,064	\$ -
Lloyds Scale - Layer Results								
Base - 5,000 XS 0	Sub1 - 5,000 XS 5,000	Sub2 - 15,000 XS 10,000	Sub3 - 25,000 XS 25,000	Layer1 - 10,000 XS 50,000	Layer2 - 40,000 XS 60,000	Layer3 - 150,000 XS 100,000	Layer4 - 750,000 XS 250,000	
\$ 11,056	\$ 2,363	\$ 3,460	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
\$ 11,056	\$ 2,363	\$ 3,460	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
\$ 11,056	\$ 2,363	\$ 3,460	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
\$ 11,056	\$ 2,363	\$ 3,460	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
\$ 23,911	\$ 5,092	\$ 7,616	\$ 7,660	\$ -	\$ -	\$ -	\$ -	\$ -
\$ 23,911	\$ 5,092	\$ 7,616	\$ 7,660	\$ -	\$ -	\$ -	\$ -	\$ -
\$ 23,911	\$ 5,092	\$ 7,616	\$ 7,660	\$ -	\$ -	\$ -	\$ -	\$ -
\$ 23,911	\$ 5,092	\$ 7,616	\$ 7,660	\$ -	\$ -	\$ -	\$ -	\$ -
\$ 47,612	\$ 20,865	\$ 23,121	\$ 23,121	\$ 5,800	\$ 12,729	\$ 27,874	\$ -	\$ -
\$ 47,612	\$ 20,865	\$ 23,121	\$ 23,121	\$ 5,800	\$ 12,729	\$ 27,874	\$ -	\$ -
\$ 47,612	\$ 20,865	\$ 23,121	\$ 23,121	\$ 5,800	\$ 12,729	\$ 27,874	\$ -	\$ -
\$ 47,612	\$ 20,865	\$ 23,121	\$ 23,121	\$ 5,800	\$ 12,729	\$ 27,874	\$ -	\$ -
\$ 39,411	\$ 17,271	\$ 19,139	\$ 19,139	\$ 4,801	\$ 10,536	\$ 23,073	\$ -	\$ -
\$ 39,411	\$ 17,271	\$ 19,139	\$ 19,139	\$ 4,801	\$ 10,536	\$ 23,073	\$ -	\$ -
\$ 39,411	\$ 17,271	\$ 19,139	\$ 19,139	\$ 4,801	\$ 10,536	\$ 23,073	\$ -	\$ -
\$ 39,411	\$ 17,271	\$ 19,139	\$ 19,139	\$ 4,801	\$ 10,536	\$ 23,073	\$ -	\$ -
\$ 93,646	\$ 28,660	\$ 57,654	\$ 38,325	\$ 15,330	\$ 31,327	\$ 68,319	\$ -	\$ -
\$ 93,646	\$ 28,660	\$ 57,654	\$ 38,325	\$ 15,330	\$ 31,327	\$ 68,319	\$ -	\$ -
\$ 93,646	\$ 28,660	\$ 57,654	\$ 38,325	\$ 15,330	\$ 31,327	\$ 68,319	\$ -	\$ -
\$ 93,646	\$ 28,660	\$ 57,654	\$ 38,325	\$ 15,330	\$ 31,327	\$ 68,319	\$ -	\$ -



Layering Example – MBBEFD Combined (including PML Usage Concepts)

Display Components

Select CAT Treatment

Attritional
 Minor CAT

Select PSOLD Curve

Stable (All Years)
 Responsive (5 Years)

Select Coverage

Buildings
 Contents
 Time Element

Select Peril

BG1
 BG2
 SCL

All Components-PSOLD

Select Layer Source

PSOLD Cap
 Lloyds
 MBBEFD (Y1-Y4) Set
 Custom

OK Cancel

Expected Claim Counts - Exper Period	0.56	0.34	0.15	0.04	0.04	0.02
100.0%	18.1%	11.8%	20.4%	23.0%	2.9%	9.2%
Return Period:	9.0	14.7	33.5	127.3	137.6	222.0
Layer Frequency:	0.111	0.068	0.030	0.008	0.007	0.004

TOTALS	
20	\$ 3,560,000,000

ISO Rapid Valuator - Outputs

Description/Record Index	Buildings + Content AOI
1: Office - Layer 1	\$ 25,000,000
2: Office - Layer 2	\$ 25,000,000
3: Office - Layer 2	\$ 25,000,000
4: Office - Layer 4	\$ 25,000,000
5: Storage - Layer 1	\$ 50,000,000
6: Storage - Layer 2	\$ 50,000,000
7: Storage - Layer 3	\$ 50,000,000
8: Storage - Layer 4	\$ 50,000,000
9: Medium Manufacturing - Layer 1	\$ 200,000,000
10: Medium Manufacturing - Layer 2	\$ 200,000,000
11: Medium Manufacturing - Layer 3	\$ 200,000,000
12: Medium Manufacturing - Layer 4	\$ 200,000,000
13: High Hazard HPR - Layer 1	\$ 200,000,000
14: High Hazard HPR - Layer 2	\$ 200,000,000
15: High Hazard HPR - Layer 3	\$ 200,000,000
16: High Hazard HPR - Layer 4	\$ 200,000,000
17: Energy - Layer 1	\$ 250,000,000
18: Energy - Layer 2	\$ 250,000,000
19: Energy - Layer 3	\$ 250,000,000
20: Energy - Layer 4	\$ 250,000,000

\$ 2,882,090	Layer Deductible
\$ 2,882,090	\$0
\$ -	\$ 55,112,982
\$ 2,755,649	\$ 2,755,649
PSOLD Input	PSOLD Output
PSOLD-Gross Attritional Losses	PSOLD-Net Attritional Losses
\$ 16,879	\$ 16,879
\$ 16,879	\$ 16,879
\$ 16,879	\$ 16,879
\$ 16,879	\$ 16,879
\$ 44,279	\$ 44,279
\$ 44,279	\$ 44,279
\$ 44,279	\$ 44,279
\$ 44,279	\$ 44,279
\$ 161,123	\$ 161,123
\$ 161,123	\$ 161,123
\$ 161,123	\$ 161,123
\$ 161,123	\$ 161,123
\$ 133,370	\$ 133,370
\$ 133,370	\$ 133,370
\$ 133,370	\$ 133,370
\$ 133,370	\$ 133,370
\$ 333,261	\$ 333,261
\$ 333,261	\$ 333,261
\$ 333,261	\$ 333,261
\$ 333,261	\$ 333,261

Participation Percentage (Using PSOLD detail results - All Years)

100%	100%	100%	100%	100%	100%	100%	100%
\$ 498,361	\$ 324,087	\$ 561,688	\$ 634,326	\$ 78,554	\$ 253,768	\$ 404,864	\$ -

MBBEFD: Combined Scale - Layer Results

Base - 5,000 XS 0	Sub1 - 5,000 XS 5,000	Sub2 - 15,000 XS 10,000	Sub3 - 25,000 XS 25,000	Layer1 - 10,000 XS 50,000	Layer2 - 40,000 XS 60,000	Layer3 - 150,000 XS 100,000	Layer4 - 750,000 XS 250,000
\$ 9,283	\$ 2,869	\$ 4,726	\$ -	\$ -	\$ -	\$ -	\$ -
\$ 9,283	\$ 2,869	\$ 4,726	\$ -	\$ -	\$ -	\$ -	\$ -
\$ 9,283	\$ 2,869	\$ 4,726	\$ -	\$ -	\$ -	\$ -	\$ -
\$ 9,283	\$ 2,869	\$ 4,726	\$ -	\$ -	\$ -	\$ -	\$ -
\$ 14,169	\$ 10,184	\$ 10,184	\$ 9,741	\$ -	\$ -	\$ -	\$ -
\$ 14,169	\$ 10,184	\$ 10,184	\$ 9,741	\$ -	\$ -	\$ -	\$ -
\$ 14,169	\$ 10,184	\$ 10,184	\$ 9,741	\$ -	\$ -	\$ -	\$ -
\$ 14,169	\$ 10,184	\$ 10,184	\$ 9,741	\$ -	\$ -	\$ -	\$ -
\$ 29,808	\$ 15,307	\$ 35,850	\$ 35,850	\$ 5,639	\$ 16,112	\$ 22,557	\$ -
\$ 29,808	\$ 15,307	\$ 35,850	\$ 35,850	\$ 5,639	\$ 16,112	\$ 22,557	\$ -
\$ 29,808	\$ 15,307	\$ 35,850	\$ 35,850	\$ 5,639	\$ 16,112	\$ 22,557	\$ -
\$ 29,808	\$ 15,307	\$ 35,850	\$ 35,850	\$ 5,639	\$ 16,112	\$ 22,557	\$ -
\$ 24,673	\$ 12,670	\$ 29,675	\$ 29,675	\$ 4,668	\$ 13,337	\$ 18,672	\$ -
\$ 24,673	\$ 12,670	\$ 29,675	\$ 29,675	\$ 4,668	\$ 13,337	\$ 18,672	\$ -
\$ 24,673	\$ 12,670	\$ 29,675	\$ 29,675	\$ 4,668	\$ 13,337	\$ 18,672	\$ -
\$ 24,673	\$ 12,670	\$ 29,675	\$ 29,675	\$ 4,668	\$ 13,337	\$ 18,672	\$ -
\$ 46,657	\$ 39,991	\$ 59,987	\$ 83,315	\$ 9,331	\$ 33,993	\$ 59,987	\$ -
\$ 46,657	\$ 39,991	\$ 59,987	\$ 83,315	\$ 9,331	\$ 33,993	\$ 59,987	\$ -
\$ 46,657	\$ 39,991	\$ 59,987	\$ 83,315	\$ 9,331	\$ 33,993	\$ 59,987	\$ -
\$ 46,657	\$ 39,991	\$ 59,987	\$ 83,315	\$ 9,331	\$ 33,993	\$ 59,987	\$ -

Define MBBEFD Curve

	Total B&C AOI	PML Factor	PML %
<input type="radio"/> All Y1	1,000	1	.9
<input type="radio"/> All Y2	1,000,000	1.4	.9
<input type="radio"/> All Y3	10,000,000	1.6	.9
<input type="radio"/> All Y4	100,000,000	1.8	.9
<input checked="" type="radio"/> Combined			

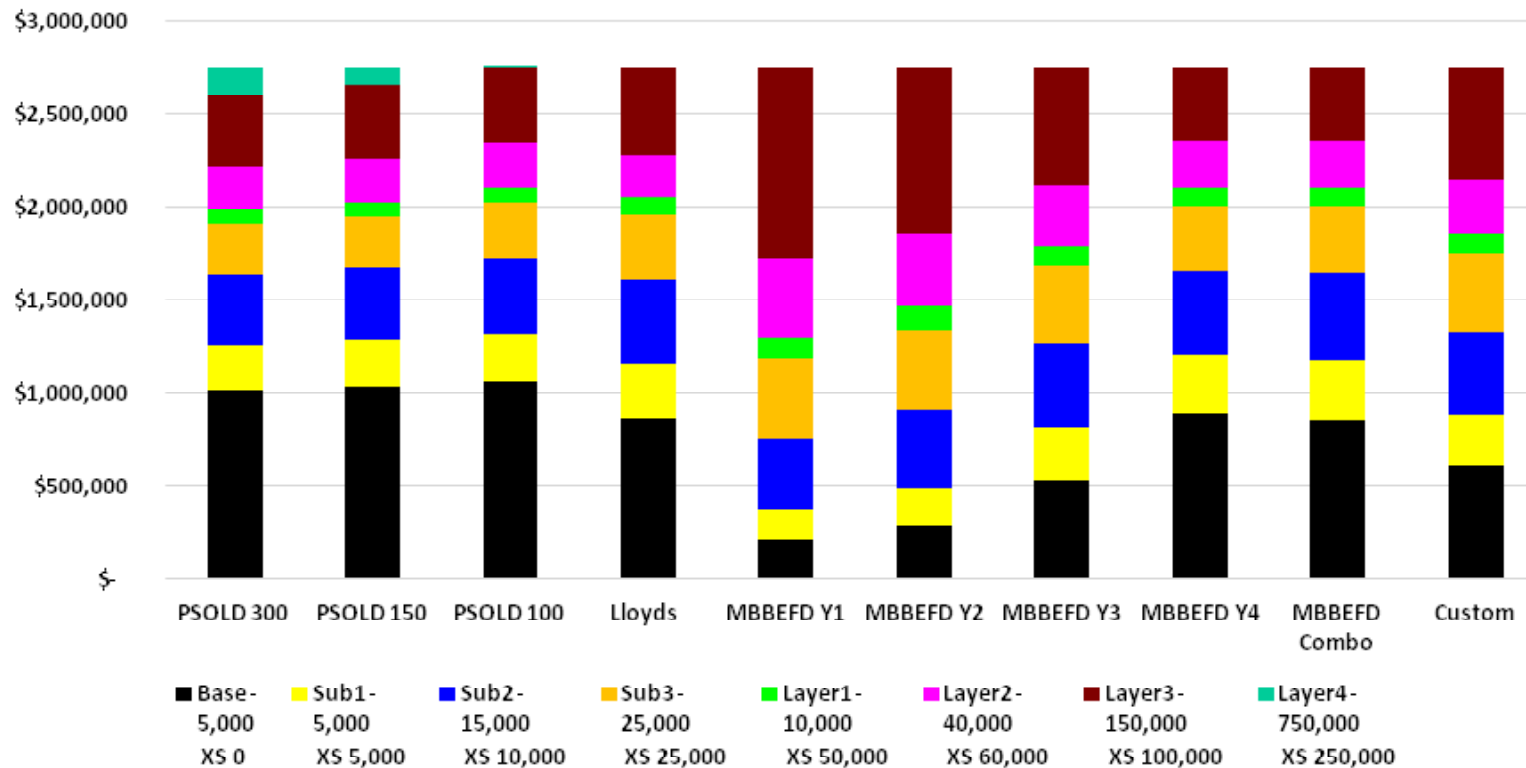
OK Cancel

Note: Values shown may not match options selected



PSOLD vs. Alt Scales Lloyd's, MBBEFD

PSOLD Curves vs. Lloyds, MBBEFD, Custom Sample exposures





Sample PSOLD Curve Volumes and Average Severities by AOI Band

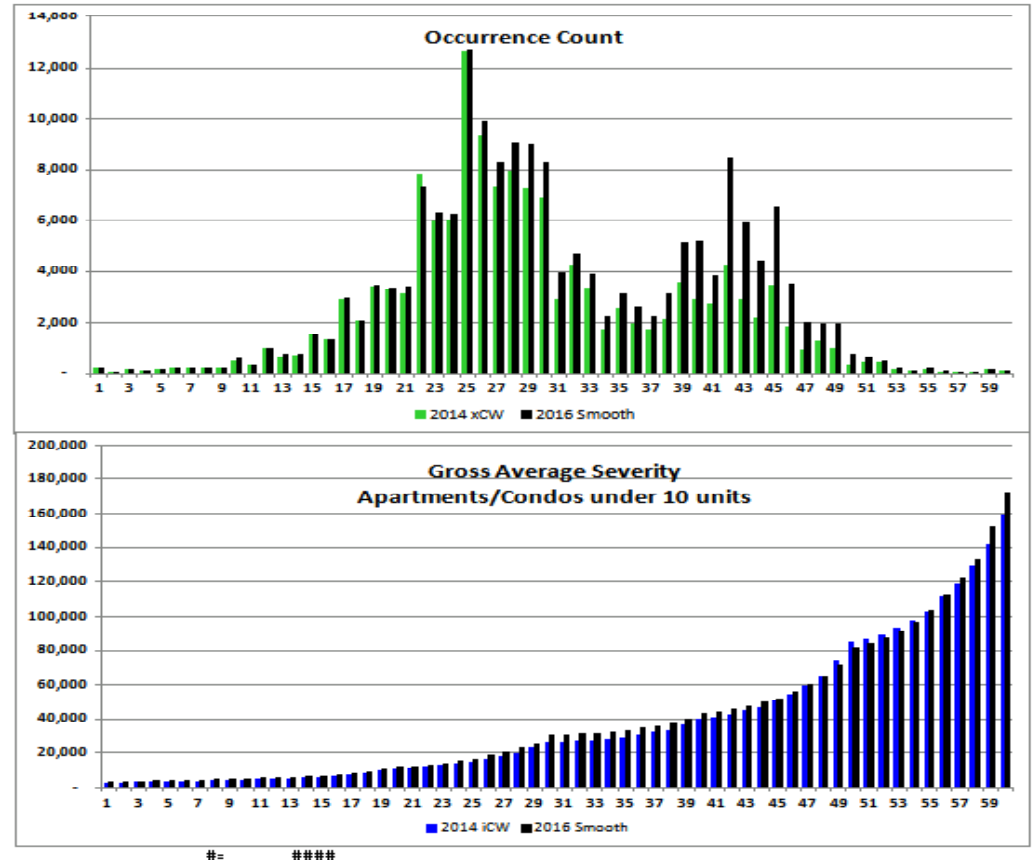
2014 vs. 2017 – Apts/Condos <10 Units

Illustrative

	2014 xCW	2017 Smooth	2014 iCW	2017 Smooth
AOI Group Min			Avg Sev	Avg Sev
AOI Group Max				
Occurrence			Occurrence	
1	0	2,000	214	199
2	2,001	3,000	44	54
3	3,001	4,000	174	176
4	4,001	5,000	108	107
5	5,001	6,000	152	166
6	6,001	7,000	229	200
7	7,001	8,000	180	221
8	8,001	9,000	188	221
9	9,001	10,000	222	214
10	10,001	13,000	488	579
11	13,001	15,000	912	209
12	15,001	20,000	958	967
13	20,001	25,000	646	760
14	25,001	30,000	692	766
15	30,001	40,000	1,501	1,526
16	40,001	50,000	1,313	1,323
17	50,001	60,000	2,311	2,952
18	60,001	75,000	2,071	2,045
19	75,001	100,000	3,396	3,440
20	100,001	125,000	3,289	3,321
21	125,001	150,000	3,091	3,403
22	150,001	200,000	7,839	7,348
23	200,001	250,000	5,964	6,309
24	250,001	300,000	6,010	6,214
25	300,001	400,000	12,627	12,675
26	400,001	500,000	9,376	9,920
27	500,001	600,000	7,301	8,245
28	600,001	750,000	7,910	9,093
29	750,001	1,000,000	7,271	9,028
30	1,000,001	1,250,000	6,839	8,261
31	1,250,001	1,500,000	2,900	3,929
32	1,500,001	2,000,000	4,273	4,675
33	2,000,001	2,500,000	3,333	3,848
34	2,500,001	3,000,000	1,719	2,216
35	3,000,001	4,000,000	2,566	3,123
36	4,000,001	5,000,000	1,966	2,616
37	5,000,001	6,000,000	1,722	2,251
38	6,000,001	7,500,000	2,113	3,106
39	7,500,001	10,000,000	3,522	5,139
40	10,000,001	12,500,000	2,879	5,175
41	12,500,001	15,000,000	2,724	3,839
42	15,000,001	20,000,000	4,263	8,404
43	20,000,001	25,000,000	2,880	5,882
44	25,000,001	30,000,000	2,152	4,414
45	30,000,001	40,000,000	3,424	6,497
46	40,000,001	50,000,000	1,861	3,469
47	50,000,001	60,000,000	914	1,997
48	60,000,001	75,000,000	1,267	1,979
49	75,000,001	100,000,000	950	1,970
50	100,000,001	125,000,000	329	724
51	125,000,001	150,000,000	408	654
52	150,000,001	200,000,000	433	489
53	200,000,001	250,000,000	137	181
54	250,000,001	300,000,000	84	104
55	300,000,001	400,000,000	161	226
56	400,000,001	500,000,000	68	74
57	500,000,001	600,000,000	57	47
58	600,000,001	750,000,000	47	42
59	750,000,001	1,000,000,000	137	149
60	1,000,000,001	and above	98	101
			142,708	177,350
			23,968	29,643

Note: PSOLD CP 2017 = PSOLD 2016 with smoothing (released with IRV v5-1/2018)

Rating Group: **Apartments/Condos under 10 units**



Note: Values shown may not match options selected

SERVE | ADD VALUE | INNOVATE

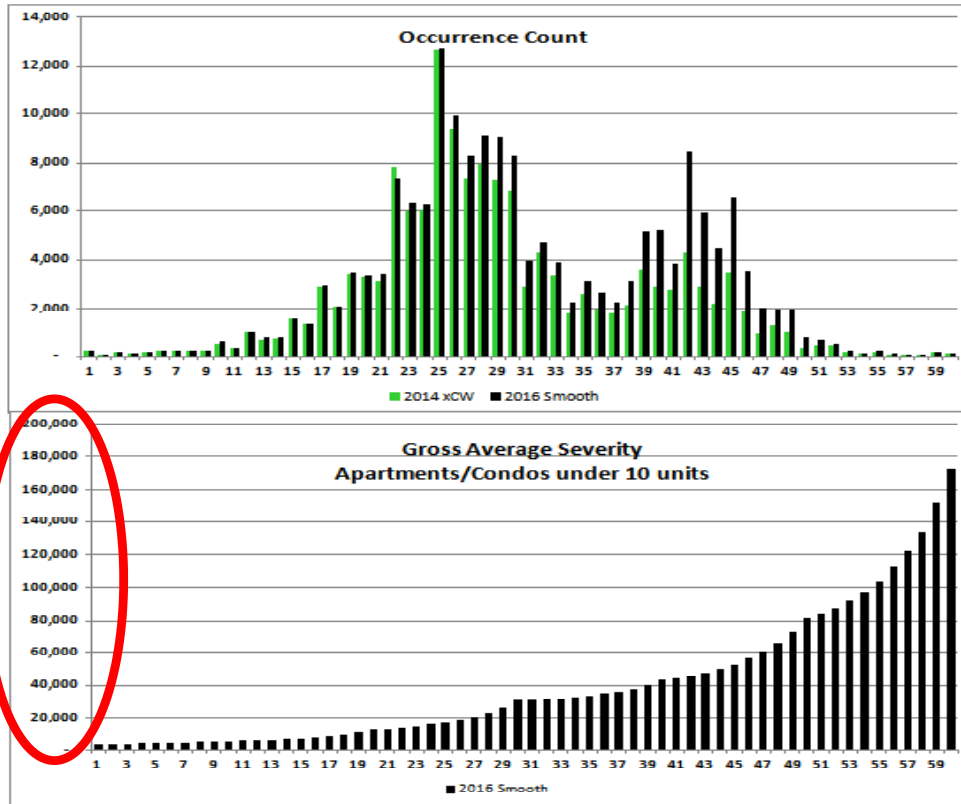
PSOLD 2017 – Sample Counts and Curve Comparison



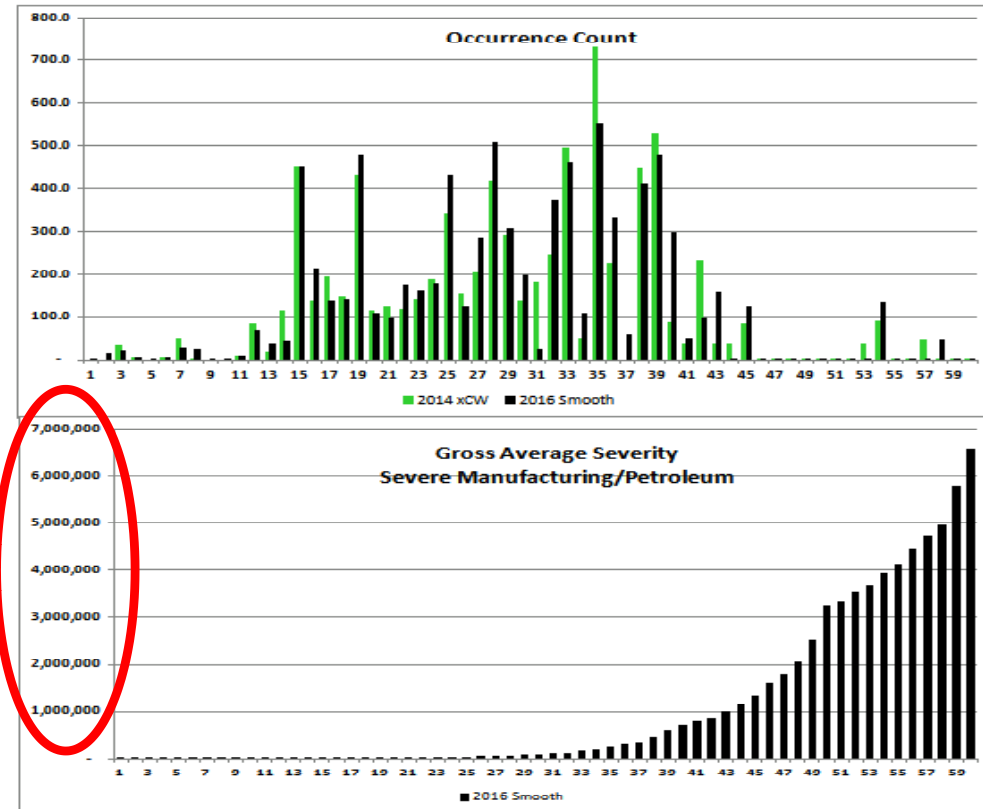
Apts<10 units vs. Severe Manufacturing

Illustrative

Rating Group: **Apartments/Condos under 10 units**



Rating Group: **Severe Manufacturing/Petroleum**



Note: Values shown may not match options selected

SERVE | ADD VALUE | INNOVATE



IRV / PSOLD 2017 Component Pricing – 5 Risks / 4 Layers- gross Coverages / Perils including Business Interruption (TE) (7)

Illustrative

Coverage & Peril Component Summary (Attritional Only) - Stable (All Years)

IRV Component Loss Costs	Total All Layers	5,000	5,000	15,000	25,000	10,000	40,000	150,000	750,000	No Layer	No Layer
		XS 0	XS 5,000	XS 10,000	XS 25,000	XS 50,000	XS 60,000	XS 100,000	XS 250,000		
BG1 - Buildings	\$ 1,035,430	\$ 480,296	\$ 114,897	\$ 160,386	\$ 110,593	\$ 25,658	\$ 63,158	\$ 72,743	\$ 7,699	\$ -	\$ -
BG1 - Contents	\$ 488,090	\$ 217,449	\$ 67,182	\$ 88,088	\$ 68,675	\$ 19,319	\$ 27,377	\$ -	\$ -	\$ -	\$ -
BG2 - Buildings	\$ 102,205	\$ 42,546	\$ 5,152	\$ 8,922	\$ 10,329	\$ 3,374	\$ 10,686	\$ 18,925	\$ 2,272	\$ -	\$ -
BG2 - Contents	\$ 52,335	\$ 30,588	\$ 5,849	\$ 8,551	\$ 5,189	\$ 1,003	\$ 1,154	\$ -	\$ -	\$ -	\$ -
SCL - Buildings	\$ 227,029	\$ 107,593	\$ 16,119	\$ 30,336	\$ 28,631	\$ 7,337	\$ 17,783	\$ 17,883	\$ 1,347	\$ -	\$ -
SCL - Contents	\$ 205,224	\$ 104,027	\$ 13,954	\$ 27,647	\$ 32,840	\$ 10,801	\$ 15,955	\$ -	\$ -	\$ -	\$ -
Time Element	\$ 645,337	\$ 274,192	\$ 89,728	\$ 135,504	\$ 92,499	\$ 22,694	\$ 30,721	\$ -	\$ -	\$ -	\$ -
Buildings - BG1+BG2+SCL	\$ 1,364,663	\$ 630,435	\$ 136,168	\$ 199,643	\$ 149,553	\$ 36,368	\$ 91,626	\$ 109,551	\$ 11,318	\$ -	\$ -
Contents - BG1+BG2+SCL	\$ 745,649	\$ 352,065	\$ 86,985	\$ 124,286	\$ 106,703	\$ 31,124	\$ 44,486	\$ -	\$ -	\$ -	\$ -
BG1 - Buildings+Contents	\$ 1,523,520	\$ 697,745	\$ 182,080	\$ 248,474	\$ 179,268	\$ 44,977	\$ 90,535	\$ 72,743	\$ 7,699	\$ -	\$ -
BG2 - Buildings+Contents	\$ 154,539	\$ 73,134	\$ 11,001	\$ 17,473	\$ 15,518	\$ 4,377	\$ 11,839	\$ 18,925	\$ 2,272	\$ -	\$ -
SCL - Buildings+Contents	\$ 432,252	\$ 211,621	\$ 30,073	\$ 57,982	\$ 61,471	\$ 18,138	\$ 33,738	\$ 17,883	\$ 1,347	\$ -	\$ -
B+C+TE+All Perils- Components	\$ 2,755,649	\$ 1,256,691	\$ 312,881	\$ 459,433	\$ 348,755	\$ 90,186	\$ 166,833	\$ 109,551	\$ 11,318	\$ -	\$ -
B+C+TE+All Perils- PSOLD	\$ 2,755,649	\$ 1,032,647	\$ 253,775	\$ 382,704	\$ 285,332	\$ 76,632	\$ 229,590	\$ 397,630	\$ 97,339	\$ -	\$ -
Difference	\$ 0	\$ 224,045	\$ 59,106	\$ 76,730	\$ 63,423	\$ 13,554	\$ (62,757)	\$ (288,079)	\$ (86,022)	\$ -	\$ -

Note: Parallel display option: keeps layered values in original syndicated columns.

Note: Values shown may not match options selected



PSOLD Components – Gross All Occupancies (including smoothed curves)

PSOLD 2017 Excess Claims Frequency per \$1B Premium by Peril - All Occupancies - Gross

Layer Width	XS	Retention	Att All Perils B+C+TE Excess Claims	Att All Perils Buildings Excess Claims	Att All Perils Contents Excess Claims	Att All Perils B+C Excess Claims	Att BG1 B+C+TE Excess Claims	Att BG1 Buildings Excess Claims	Att BG1 Contents Excess Claims	Att BG1 B+C Excess Claims
Total Occurrence Count			5,181,247	2,693,416	1,922,312	5,188,674	1,983,599	1,093,199	521,963	1,804,090
5,000	XS	10,000	2.392	1.857	1.881	2.276	3.107	2.379	2.570	2.953
10,000	XS	15,000	1.174	0.872	0.905	1.114	1.470	1.076	1.201	1.388
25,000	XS	25,000	0.478	0.349	0.348	0.447	0.575	0.417	0.432	0.536
30,000	XS	50,000	0.133	0.103	0.067	0.117	0.137	0.111	0.069	0.123
20,000	XS	80,000	0.066	0.051	0.022	0.053	0.062	0.049	0.024	0.054
50,000	XS	100,000	0.048	0.037	0.012	0.037	0.044	0.033	0.016	0.039
50,000	XS	150,000	0.024	0.018	0.003	0.018	0.022	0.015	0.006	0.019
50,000	XS	200,000	0.014	0.011	0.001	0.010	0.013	0.008	0.003	0.011
150,000	XS	250,000	0.008	0.007	0.001	0.006	0.008	0.005	0.002	0.007
100,000	XS	400,000	0.002	0.002	0.000	0.001	0.002	0.001	0.000	0.002
500,000	XS	500,000	0.001	0.001	0.000	0.001	0.001	0.000	0.000	0.001

Layer Width	XS	Retention	Att BG2 B+C+TE Excess Claims	Att BG2 Buildings Excess Claims	Att BG2 Contents Excess Claims	Att BG2 B+C Excess Claims	Att SCL B+C+TE Excess Claims	Att SCL Buildings Excess Claims	Att SCL Contents Excess Claims	Att SCL B+C Excess Claims
Total Occurrence Count			1,125,114	690,842	228,561	1,031,397	2,739,098	947,110	1,209,420	2,510,137
5,000	XS	10,000	1.766	0.944	2.983	1.705	1.000	1.130	0.725	0.950
10,000	XS	15,000	1.004	0.542	1.802	0.983	0.536	0.645	0.403	0.501
25,000	XS	25,000	0.572	0.327	0.939	0.584	0.263	0.336	0.167	0.244
30,000	XS	50,000	0.283	0.162	0.285	0.274	0.097	0.105	0.047	0.086
20,000	XS	80,000	0.165	0.092	0.098	0.147	0.042	0.041	0.021	0.033
50,000	XS	100,000	0.128	0.070	0.057	0.110	0.027	0.024	0.014	0.019
50,000	XS	150,000	0.070	0.036	0.017	0.056	0.010	0.008	0.006	0.005
50,000	XS	200,000	0.041	0.022	0.007	0.033	0.005	0.003	0.003	0.002
150,000	XS	250,000	0.024	0.013	0.003	0.019	0.002	0.002	0.002	0.001
100,000	XS	400,000	0.005	0.003	0.001	0.004	0.000	0.000	0.000	0.000
500,000	XS	500,000	0.002	0.001	0.000	0.001	0.000	0.000	0.000	0.000

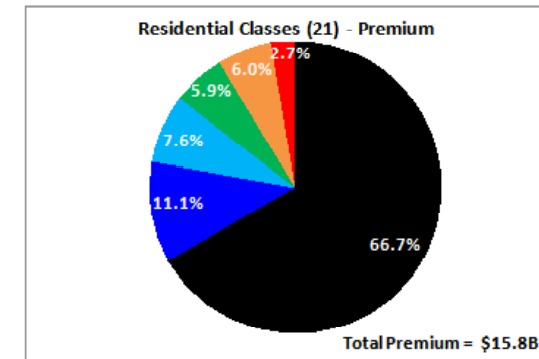
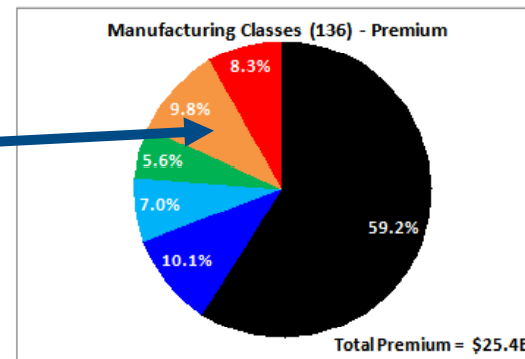
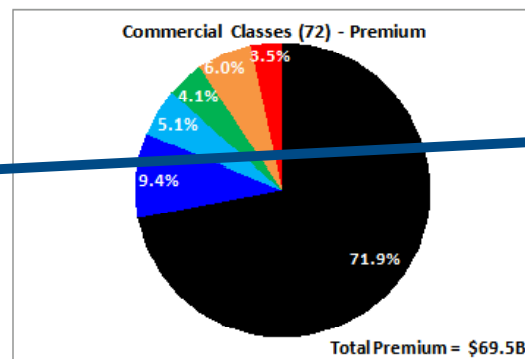
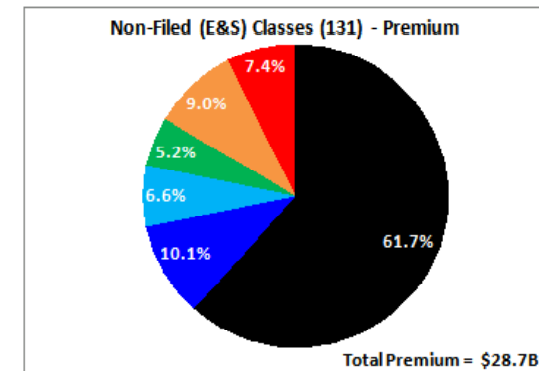
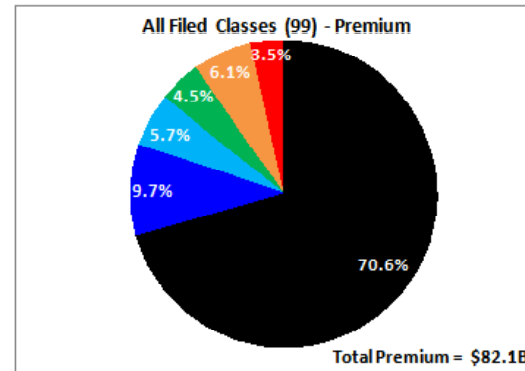
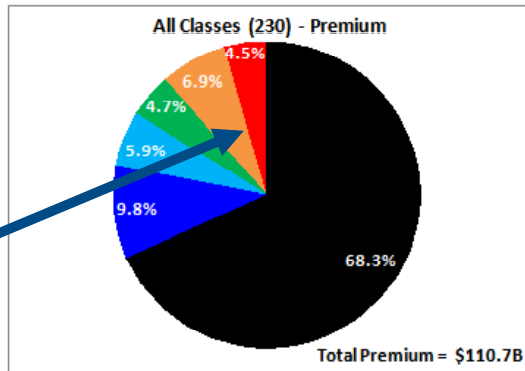
Note: Total Gross AOI = \$38.0T, Total Gross Loss \$235.5B



Large Policy Analysis

Underlying the ground-up pricing and curves is significant amount of information for larger policies. About 11% of total premium is related to policies greater than 100 million AOI, with about 16% of the non-filed categories being from these largest policies. About 26% of the total premium collected and analyze is in the Non-filed (E&S) categories.

About 18% of the premium is for 136 manufacturing occupancies, including 78 HPR, are related to policy sizes larger than 100M is.



0-10M
 10-25M
 25-50M
 50-100M
 100-500M
 >500M

Note: Data underlying IRV / PSOLD ground-up and excess loss costs; all 230 ISO CSP Occupancies, 38 IRV/PSOLD Rating Groups - Filed / Non-filed (E&S) Policy Years 2000-2015 - Net of deductibles, Undeveloped, Untrended, Stat data; Manufacturing including 78 HPR categories



US to International Property Risk Excess Loss Factors COPE Assessment Matrix – Steps

- 1. Start with a list of potential differences between the US and target countries**
 - Standard in Property Underwriting is COPE – Construction, Occupancy, Protection, and Exposure
 - To this list, we add ARM: Amounts of Insurance, Rebuilding costs, Miscellaneous (social, etc.)
- 2. Assess whether each item would favorably or unfavorably impact expected loss results compared to the US**
 - expected to **reduce (positive)** or **increase (negative)** the excess losses, no impact or unknown
- 3. Attempt to evaluate magnitude of the impact of each item**
 - Low, Medium, High, or unknown
- 4. Tally the expected cumulative effect of each of the COPE (ARM) items**
 - Include direction and magnitude of all items
 - Could vary for example by groups of occupancies (e.g. Facilities)
- 5. Reconcile total impact assessment to historical excess loss layers vs. US**
 - Review actual number of large claims to US, using exposure base such as \$B of subject premium
 - Review cross country comparisons
- 6. Can do the same for Ground-up Loss Costs as proxy outside the US**



US to International Property Risk Excess Loss Factors

PSOLD International: COPE Assessment Matrix (for illustration only)

Commercial / Industrial

		US	Country A	Country B	Country C	Country D	Country E	Country F	Country G
COPE	C Construction		H	M	L		M	M	M
	O Occupancy		L	H		M		H	L
	P Protection			M	M	M	H	M	H
	E Exposure (e.g. Industrial facilities)			M	L	H			L
FARM	A Amount of Insurance		M			M	L	H	M
	R Replacement Costs		M	L	H	L	L	H	M
	M Miscellaneous			M		L		H	
Total Indicated (before validation)				H		M	L	L	H

Impact Key (compared to US)	
Direction	Worse
	Better
	No difference
Magnitude	H = High
	M = Moderate
	L = Low

1. With US as base, compare each COPE+ attribute
2. Tally up expected impacts and qualitatively weigh them by COPE+ attribute
3. See how compares to actual large loss experience
4. Use same procedure for Ground-up Loss Costs, but include Frequency component – COPE+FARM



Deeper Analysis into Ground-up Pricing Basics - COPE

Illustrative

Ground-up pricing involves using AOIs from statement of values, and incorporating many other factors and COPE adjustments. Estimates on total, or by coverage/peril component can be estimated.

If using component curves, the individual coverage and peril loss costs including time element can be run together as one unit, or separately and then combined via relevant statistics and simulation.

More Info - Individual Exposure and Loss Cost (LC) Information

A - Exposure Info

Exposure Number	1	Sprinkler Status	Part	Description	1: Office
Building AOI	40,000,000	Construction Type	Joisted Masonry	Occupancy	0702: Non-Governmental Offices and Banks
Contents AOI	5,000,000	BG2 Symbol	Ordinary	City, State/Region	Alabama
Time Element AOI	10,000,000	PPC	10	Zip Code	35004
Deductible	1,000	Prometrix Risk ID		Address	
BG1 Circular Number	LI-CF-2016-057	Latitude/Longitude		Conflagration Potential	TBD
BG1 Circular Date	2/1/2017				

B - LC Details

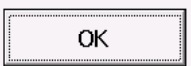
	BG1 (Fire et al)		iHU BG2 (Wind et al)		SCL (Ice/snow, theft, et al)	
	Building	Contents	Building	Contents	Building	Contents
LC Factor	0.122	0.165	0.091	0.077	0.047	0.141
LOL Factor	0.469	0.427	0.455	0.434	0.350	0.153
Scalar Adjustment	1.000	1.000	1.000	1.000	1.000	1.000
Sprinkler Credit	0.150	0.150				
PPC Factor	1.580	1.580				
Loss Cost	27,664	4,258	14,906	1,504	5,922	971



C - LC Summaries

Peril Totals	E&S Peril Scalars	Coverage Totals	Total Gross Loss Cost - Class	63,319
Total BG1 LC	31,922	BG1 1.00	Total Building LC	48,492
Total BG2 LC	16,410	BG2 1.00	Total Contents LC	6,733
Total SCL LC	6,893	SCL 1.00	Time Element LC	8,095
Total TE LC	8,095	TE: % 15.0		
Total LC xTE	55,224	Total LC	63,319	
			Attritional Gross Loss Cost	40,371
			Attritional Net Loss Cost*	20,743

Note: Above Loss Costs may include other default or customized class or specific location adjustments for e.g. coinsurance (Value = 0.90), experience credits, etc. TE LC is based on BG1 + BG2 pre-sprinkler Loss Costs.



*Losses > \$1M

Note: Values shown may not match options selected

IRV - Initial Settings

ISO Rapid Valuator™ - Initial Settings

Account/Project Filename: Company Program

Select Country Functionality

US - Full Portal Detail
 Intl + US - Countrywide
 Intl + US - Full Portal Detail

Select Submission Type

Individual Exposure Detail *Banded Profile*

Exposure Only Banded Only
 Including Syndication Incl Syndication Bands

Select Loss Cost Source

Filed/Non-admitted Premium x ELR
 Excess + Surplus GLM*

Select Loss Cost Type

Class Loss Costs
 Specific Loss Costs (Prometrix - Manual Input)*
 Specific Loss Costs (Prometrix - API)*
 Replacement Costs (XactWare - 360 Value)*

Select Peril

Total cat/noncat BG1 (Fire) SCL Only
 Total xBG2 Hurricane BG2 (Wind) BG2 (xHU)

Run PSOLD XG Coverage & Peril Components

Additional Assumptions

Minimum Burn (by peril) Yes No
Missing Construction Mapping: Yes No
Sprinkler Credit: Yes No
HPR Override Selection: Yes No
State/Multi-State Replacement: Yes No
CSP/Occupancy Replacement: Yes No
Conflagration Potential: Yes No
Coinsurance Factors: Yes No
State/Region Default PPC: Yes No
CAT Allocations: Yes No
COPE Excess Override: Yes No
Time Element (TE) Override: Yes No
International Adjustments: Yes No

Select Occupancy Source (for mapping)

ISO Class Code SIC IBC_Canada AIR
 PSOLD NAICS ATC IICI_Lloyds Other

Select Coverage

Buildings (B) Contents (C) TE (TE) D+C+TE

Include Alternate Occupancy Source Automatically

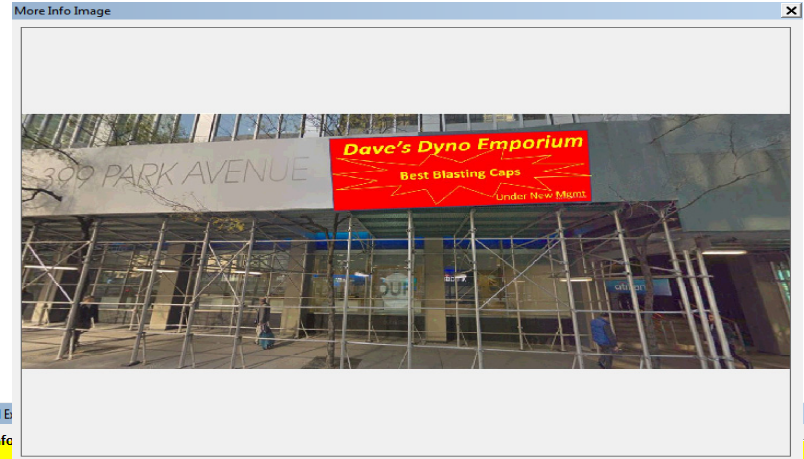
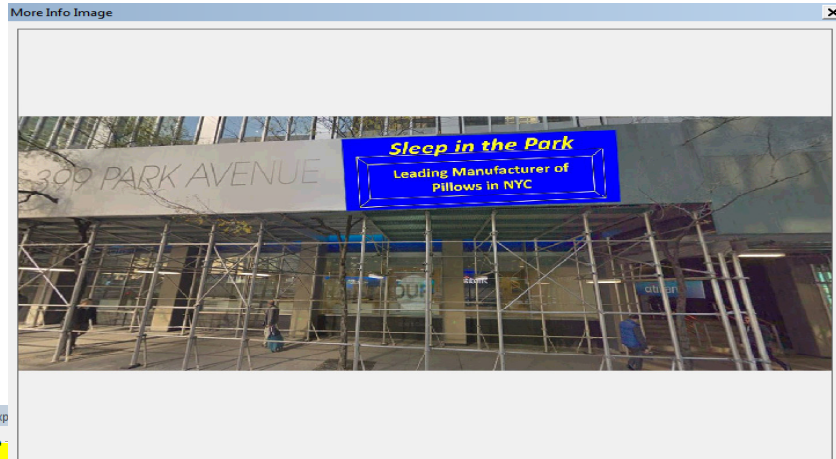
Calc Ground Up Calc Excess Calc All: GU & PSOLD API Cancel Curve Settings More Info
DB/Exe Paths Diagnostics

*Note: Additional licensing may be required for some selections above. IRV v5.0.1 (Portal v16; PSOLD2017)



Importance of Occupancy – Ground-up and Excess

Illustrative



A - Exposure Info

Exposure Number	Building AOI	Contents AOI	Time Element AOI	Deductible	RC1 Circular Number	BG1 Circular Date	Construction Type	Joisted Masonry	Original Occupancy	2800: Textile Mill Products - Natural and Synthetic	Mapped ISO Occupancy	2800: Textile Mill Products - Natural and Synthetic	City, State/Region	Countrywide	Zip Code	00099	Prometrix Risk ID	Conflagration	TRD	Latitude/Longitude
30,000,000	5,000,000	5,000,000	5,000,000	1,000	0	11/01/2015	Joisted Masonry	Joisted Masonry	2800: Textile Mill Products - Natural and Synthetic	2800: Textile Mill Products - Natural and Synthetic	Countrywide	Countrywide	Countrywide	Countrywide	00099	00099	Conflagration	TRD		

B - LC Details

	BG1 (Fire et al)		xHU BG2 (Wind et al)		SCL (Ice/snow, theft, et al)	
	Building	Contents	Building	Contents	Building	Contents
LC Factor	0.097	0.063	0.042	0.053	0.047	0.256
LOL Factor	0.487	0.483	0.381	0.372	0.370	0.201
Scalar Adjustment	1.000	1.000	1.000	1.000	1.000	1.000
Sprinkler Credit	0.150	0.150				
PPC Factor	1.000	1.000				
Loss Cost	11,491	1,234	4,318	887	4,691	2,316

C - LC Summaries

Peril Totals	E&S Peril Scalars	Coverage Totals	Total Gross Loss Cost - Class	Attributional Gross Loss Cost*
Total BG1 LC	12,725	BG1 1.00	Total Building LC	20,500
Total BG2 LC	5,205	BG2 1.00	Total Contents LC	4,436
Total SCL LC	7,006	SCL 1.00	Time Element LC	1,940
Total TE LC	1,910	TE: % 0.6		
Total LC xTE	24,936	Total LC	26,876	26,876

Note: Above Loss Costs may include other default or customized class or specific location adjustments for e.g. coinsurance (Value = 0.90), experience credits, etc. TE LC is based on BG1 + BG2 pre-sprinkler Loss Costs.

OK *Losses > 10M

A - Exposure Info

Exposure Number	Building AOI	Contents AOI	Time Element AOI	Deductible	BG1 Circular Number	BG1 Circular Date	Construction Type	Joisted Masonry	Original Occupancy	5100: Chemicals and Pharmaceuticals - High Hazard	Mapped ISO Occupancy	1400: Waste and Reclaimed Material, including Yards	City, State/Region	Countrywide	Zip Code	00099	Prometrix Risk ID	Conflagration	TBD	Address	Latitude/Longitude
30,000,000	5,000,000	5,000,000	5,000,000	1,000	0	11/01/2015	Joisted Masonry	Joisted Masonry	5100: Chemicals and Pharmaceuticals - High Hazard	5100: Chemicals and Pharmaceuticals - High Hazard	1400: Waste and Reclaimed Material, including Yards	1400: Waste and Reclaimed Material, including Yards	Countrywide	Countrywide	00099	00099	Conflagration	TBD			

B - LC Details

	BG1 (Fire et al)		xHU BG2 (Wind et al)		SCL (Ice/snow, theft, et al)	
	Building	Contents	Building	Contents	Building	Contents
LC Factor	0.248	0.342	0.042	0.053	0.047	0.131
LOL Factor	0.487	0.483	0.381	0.372	0.370	0.201
Scalar Adjustment	0.759	0.759	0.759	0.759	0.759	0.759
Sprinkler Credit	0.150	0.150				
PPC Factor	1.000	1.000				
Loss Cost	22,286	5,080	3,275	673	3,558	899

C - LC Summaries

Peril Totals	E&S Peril Scalars	Coverage Totals	Total Gross Loss Cost - Class	Attributional Gross Loss Cost*
Total BG1 LC	27,366	BG1 1.00	Total Building LC	29,119
Total BG2 LC	3,948	BG2 1.00	Total Contents LC	6,652
Total SCL LC	4,457	SCL 1.00	Time Element LC	21,332
Total TE LC	21,332	TE: % 59.0		
Total LC xTE	35,771	Total LC	57,103	57,103

Note: Above Loss Costs may include other default or customized class or specific location adjustments for e.g. coinsurance (Value = 0.90), experience credits, etc. TE LC is based on BG1 + BG2 pre-sprinkler Loss Costs.

OK *Losses > 10M

Note: Values shown may not match options selected

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