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This publication updates the Criteria report issued Dec. 22, 2008 to reflect modifications to stress testing (page 5).

This methodology is available at  
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## The Treatment of Terrorism Risk in the Rating Evaluation

The purpose of this report is to explain A.M. Best's treatment of terrorism risk in the rating evaluation of property/casualty insurers. Terrorist attacks can vary from small, conventional weapons attacks with limited insured losses to full-scale nuclear attacks with devastating impacts on insurers' resources. The types of property/casualty insurers can vary from small, single-state, monoline commercial insurers to large, national, multiline insurers or reinsurers. Despite the complexities in identifying, monitoring, quantifying and managing terrorism risks, A.M. Best believes that a comprehensive terrorism risk management process is crucial to the financial strength rating of any insurer with a material exposure to terrorism risk.

A.M. Best has stated previously that its key concerns are:

- Aggregate exposure to terrorism.
- Number of insured locations.
- Geographic concentration of insured exposures.
- Impact on capitalization.
- The uncertainty surrounding a government's long-term commitment to a federal backstop.

Although a federal backstop can help reduce the impact of terrorism losses, reliance on such a mechanism cannot replace a sound risk management process.

For exposures located in the United States, the passage of the Terrorism Risk Insurance Program Reauthorization Act of 2007 (TRIPRA) extended the federal backstop seven years and temporarily reduced A.M. Best's concerns about the U.S. government's long-term commitment to a federal role. Previous concerns about the distinction between foreign and domestic terrorism also were alleviated with the passage of TRIPRA, which now provides coverage for both types of attacks.

As a result of the changes in TRIPRA, and based upon discussions with insurers, brokers and terrorism modeling firms, A.M. Best made changes to its 2007 year-end U.S. property/casualty Supplemental Rating Questionnaire (SRQ) in anticipation of expanding its rating methodology to assess the impact of terrorism risk on an insurer's balance sheet. The changes to the SRQ included:

- Expanding the list of potential attack cities.
- Expanding the number of tiers for those cities based on probability of attack.
- Eliminating the distinction between foreign and domestic attacks.



- Allowing for the distinction between single-structure locations and campus-style locations.
- Collecting the number of insured locations with estimated insured exposures that were greater than 10% of surplus on a net of TRIPRA basis.

This report will explain the methodologies to be used on primary insurers and reinsurers, including stress tests, and the treatment of primary insurers with exposures that do not trigger the minimum threshold for coverage from the federal backstop. The report will conclude with A.M. Best's views on the treatment of other types of attacks, including chemical, biological, radiological and nuclear (CBRN).

### Standard Methodology For Primary Insurers

For insurers with a material exposure to terrorism loss, a charge to surplus will be

calculated that reflects the:

- Probability of a large-scale attack.
- Location of the attack.
- Number of large exposure concentrations.
- Size of the exposures.
- Level of detail in the coding of exposures.
- Offsets to the direct loss.

These offsets include recoveries from reinsurance, protection from federal backstops and a federal tax offset. For U.S. exposures, A.M. Best will reflect the recovery from TRIPRA. The terrorism charge will be compared with the insurer's natural catastrophe probable maximum loss (PML) and the larger of the two charges will be used in the insurer's published BCAR. If

# A.M. Best Company

## Methodology

September 2, 2009

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the terrorism charge is the larger amount and is used in the published BCAR, the PML from the natural catastrophe will be used as the second event in the terror stress test, which contemplates the potential that both events could happen.

Although the following explanation of the methodology focuses on U.S. exposures, the methodology can be applied in other jurisdictions merely by changing some of the underlying factors. The calculation begins with the underlying assumption of the annual probability of a large-scale attack that is at least the size of a 5- to 6-ton TNT truck bomb. A.M. Best has selected a 10% annual probability of a large-scale attack and assumes a maximum of only one large-scale attack per year.

The next step in the calculation is to separate target cities into tiers that reflect the level of perceived risk of attack. Based on discussions with the terrorism modeling firms, A.M. Best has created three tiers and has placed five cities in Tier 1, 21 cities in Tier 2 and all other locations in Tier 3. **Appendix A** shows the cities in each tier. After the target cities are placed into their respective tiers, a conditional probability that the attack occurs in a given tier is assigned, assuming an attack has occurred. A.M. Best will use the following conditional probabilities, assuming that an attack occurred somewhere in the United States:

<b>Tier:</b>	<b>Conditional Probability</b>
1	60%
2	30%
3	10%
<b>Total</b>	<b>100%</b>

Multiplying the annual probability of a large attack by the conditional probability that the attack occurs in a given tier yields the following table of annual probabilities that a large attack will occur in each of the tiers:

<b>Tier:</b>	<b>Annual Probability</b>
1	6%
2	3%
3	1%
<b>Total</b>	<b>10%</b>

Using the information gathered in the terrorism section of the SRQ submitted by the company, A.M. Best will multiply the annual probability for each tier by the number of exposures greater than 10% of surplus (net of reinsurance and TRIPRA) for each tier, up to a maximum of 100% in any single tier. This calculation is performed to reflect the higher risk to a company insuring more locations in a given tier than to another company insuring fewer locations in a given tier, as well as the higher risk to a company insuring locations in a higher risk city than to another company insuring locations in a lower risk city. A.M. Best does not use the probabilities associated with individual locations provided by the terrorism models, because these extremely low individual location probabilities render expected losses too low to reasonably evaluate an insurer's financial strength, should a loss occur at the individual location.

The probability adjusted for the number and location of exposures calculated for each tier is multiplied by the largest exposure (net of reinsurance and TRIPRA) in each tier, and will be reduced by a 35% federal tax to get an after-tax terrorism charge for each tier. The largest of the three terrorism charges will be compared with the after-tax natural catastrophe PML, and if the terrorism charge is larger, the terrorism charge will replace the natural catastrophe PML in the published BCAR.

During the calculation of the terrorism charge, A.M. Best will also make an adjustment to the terrorism loss estimates submitted in the SRQ based upon the quality of the data used in the SRQ responses. The quality of the data used in a model is of paramount importance when evaluating the results of any model. A.M. Best will add a surcharge to the loss estimates used in the terror charge based upon the level of exposures geocoded to street-address

## Exhibit 1 Geocode Surcharges

<b>% Geocoded to street address</b>	<b>Surcharge</b>
<50%	25%
50% - 59%	20%
60% - 69%	15%
70% - 79%	10%
80% - 89%	5%
90% - 100%	0%

level of detail. The lower the percentage of exposures coded to the street-address level, the higher the surcharge applied to the loss estimates.

The surcharges are shown in **Exhibit 1** and will be applied giving consideration for the company's deductible and co-participation under TRIPRA.

Some insurers have made a strong effort to geocode their exposures to street-address level in certain geographic areas that contain their largest exposures, but they have not made the same effort for exposures in other geographic areas. The percentages required for the level of geocoding are on a countrywide basis and do not reflect this characteristic. To the extent that the insurer can demonstrate there are no large exposure concentrations outside of the rigorously geocoded area, the surcharges can be reduced by the analyst. Insurers then should be prepared to discuss their plans to improve the quality of the data in geographic areas that are missing geocoded addresses, insured values or employee data, since these missing data could have negative impacts on other issues that influence the rating analysis, including natural catastrophe modeling and enterprise risk management (ERM). For those insurers that do not provide the percentage of exposures geocoded to street-address level, the analysts will apply the maximum surcharge.

A sample calculation of the standard methodology for primary insurers is shown in **Appendix B**, using the deterministic scenario and modeled loss estimates provided in the SRQ. A similar analysis is done for insurers that do not use a terrorism model by using the maximum foreseeable loss (MFL) accumulation responses provided in the SRQ.

The types of property/casualty insurers most likely to be impacted by this methodology are workers' compensation and commercial property insurers with a low exposure to natural catastrophes. The number of ratings expected to be impacted by this methodology is minimal, but any insurer for which the rating is jeopardized will need to develop and discuss a corrective action plan with its analyst.

A.M. Best believes this methodology is a reasonable method of reflecting a charge in the published BCAR for terrorism risk,

since it takes into consideration the probability of a large-scale attack, the location of the attack, the number of large exposure concentrations, the size of the exposures, the level of detail in the coding of exposures, the offsets to the direct loss and the importance relative to other potential catastrophes. Although A.M. Best will place more emphasis on this methodology than on the stress methodology outlined below, the stress methodology will continue to be evaluated and discussed. As the expiration of a federal backstop approaches, the stress methodology will receive greater emphasis in the rating evaluation.

### **Stress Methodology For Primary Insurers**

This methodology is designed as a stress test to quantify the impact that a large, insured terrorism loss could have on a primary insurer's capitalization if protection from a federal backstop were not available. This was a valid concern in the United States because of the short-term nature of the previous federal backstops and the lack of universal support for renewal. Although the seven-year term of the current federal backstop helps to alleviate the concern, it does not eliminate it. Five years from now, the question once again will arise as insurers anticipate writing policies that will be exposed to terrorism after the expiration date of TRIPRA.

In addition, TRIPRA was approved based upon cost estimates provided by the Congressional Budget Office using expected losses that result in a recoupment of the federal share, making TRIPRA appear to have no impact on the deficit. However, if the actual industry losses are greater than expected and are large enough to prevent any federal recoupment, the treasury would have to provide as much as \$62 billion in a short time and increase the deficit. Although it is highly unlikely that no payments would be made to insurers, the possibility still exists, and a reduced payment certainly is possible given the current economic environment and the sentiment shortly after the government bailout in 2008. Furthermore, any lengthy delays in receiving the funds from the treasury while the government decides on a course of action could cause liquidity problems for the insurer.

Within the stress test, A.M. Best evaluates the largest exposures individually, using the modeled losses generated from a deterministic scenario. A.M. Best has selected a 5- to 6-ton TNT truck bomb attack as the scenario to generate the modeled losses at each concentration of exposures. This attack scenario was selected because of its ability to create an amount of damage and insured losses large enough to stress an insurer's balance sheet. For companies without modeling capabilities, A.M. Best applies a factor to the largest aggregate exposures individually to reflect the extent of expected loss based on whether the location is a single structure, campus-style location or other type of structure.

The terrorism losses are calculated net of reinsurance only and the resulting amount is reduced for any federal tax impact. The terrorism stress test is similar to the natural catastrophe stress test in that:

- The terrorism after-tax net loss is removed from surplus.
- A minimum of 40% of the ceded terrorism losses are added to the existing recoverables on the credit risk page.
- The risk charges for the recoverables are based upon the reinsurers' current financial strength ratings.
- 40% of the net pretax terror loss is added to the loss-reserve page. This amount may be adjusted based upon the reinsurance structure.

A natural catastrophe remains in the BCAR as a reduction to surplus. The resultant BCAR provides a view of the insurer's capitalization shortly after the event is assumed to have occurred. The extent of the BCAR's decline will indicate the potential exposure to the insurer's capitalization if the federal backstop were not available.

Because these adjustments only look at the worst case, A.M. Best looks at how many areas of concentration an insurer has, as well as their geographic locations. Insurance companies with more concentrations – that are in excess of 20% of surplus prior to any recoveries from a federal backstop – are at a greater risk than companies with fewer insured con-

centrations, and consequently A.M. Best will have less tolerance for a decline in the BCAR. Companies that have large concentrations in high-risk cities also will have a greater risk of loss than companies that only write in remote locations, and consequently, A.M. Best will have less tolerance for a decline in the BCAR.

A.M. Best's published minimum BCAR requirements for secure financial strength ratings are shown in **Appendix C**. The minimum BCAR requirement assumes strong, stable operating results and sound risk management. To be considered for a particular rating level, an insurer's unstressed BCAR must be at or above the minimum requirement for that rating level. Sometimes, because of a volatile operating history, weak business profile or poor risk management of an insurer, the unstressed BCAR must be maintained substantially higher than the minimum requirement for the targeted rating level. Assuming the unstressed BCAR and other rating factors meet the requirements of a targeted rating level, the stressed BCAR will not be allowed to fall more than a certain number of points below the minimum BCAR requirement for that targeted rating level. **Exhibit 2** shows the number of points the stressed BCAR may fall below the published minimum BCAR requirement before it fails the stress test.

**Exhibit 2** assumes that the insurer has the financial flexibility to quickly replace the lost surplus after the event. For those insurers that have limited financial flexibility, the number of points the stressed BCAR may fall below the minimum will be reduced as many as 15 points. A.M. Best's view of an insurer's financial flexibility does take into consideration the overall market conditions, which will vary over time.

## Exhibit 2 Impact of Stress Test on BCAR Score – Insurers With Strong Financial Flexibility

# of Points BCAR Can Fall Below Minimum Using Stress Scenario	Test 1	Test 2	Test 3
	Countrywide # of Areas of Concentrated Net* Losses >20% of PHS	Top 26 Cities # of Areas of Concentrated Net* Losses >20% of PHS	Top 5 Cities # of Areas of Concentrated Net* Losses >20% of PHS
30	> 19	> 9	> 4
40	15-19	8 - 9	4
50	10-14	6 - 7	3
60	< 10	< 6	< 3

\* Net of Reinsurance only, if any.

An insurer must pass all three tests to satisfy the terrorism stress test. The top five cities are those listed in **Appendix A** as Tier 1 cities. The top 26 cities include those listed in **Appendix A** as Tier 1 cities plus those that are listed as Tier 2 cities.

In addition to stress testing the capitalization of the insurer, A.M. Best also analyzes the potential impact on financial leverage by adjusting total debt to total capital and coverage ratios, as if capital is replaced through debt issuance. Companies with access to capital may elect to replenish lost funds through the issuance of equity, but the stress test is designed to provide a picture of how leveraged a company could become under certain circumstances.

In the calculation of the total debt to total capital ratio, equity is reduced by the amount of the after-tax net terror loss (net of reinsurance only) that was used in the BCAR stress test. For companies with access to various forms of capital, it is assumed that capital is replaced through debt issuance. While the publicly traded companies access capital through the public capital markets, private companies and mutuals have access to capital through sources such as private investors, trust preferreds or surplus notes issued through a pool.

Assumptions then are made as to the annual interest expense of capital raised, with consideration for prevailing interest rates and credit ratings. Estimates of earnings coverage of interest, as well as holding company sources and uses of cash, then are developed using the most recent information obtained from the company. A.M. Best does not publish the stressed BCAR, nor does it publish the results of the stress tests, but all information on the stress test and assumptions can be shared with management upon request.

As the expiration of the federal backstop draws nearer, insurers that fail the stress test will be required to present an action plan detailing the steps the insurer will take to reduce its exposure to terrorism risk in the event that a recovery from the federal backstop is not available. Issuing endorsements that exclude terrorism when the federal backstop expires may be one course of action, but insurers providing workers' comp coverage or having property exposures in fire-following

states will need to have a more detailed action plan.

### Methodology for Primary Insurers Not Triggering Federal Backstop

Although the methodologies above can be applied to all primary insurers, A.M. Best is concerned with the potential scenario that a terrorism loss could occur but fail to trigger a recovery from the terrorism backstop. For example, the industry loss required to trigger coverage under the federal backstop in the United States has increased from a \$5 million industry loss in 2002 to \$100 million in 2008, making the likelihood that an insurer will suffer a loss without any reimbursement from the federal program a much greater concern now than it was in 2002. This increase in the industry trigger is most likely to impact smaller insurers that provide coverage to businesses located in remote locations, or in locations situated far enough away from other structures that the industry loss is limited to the insurer's loss, and the insurer's loss is less than the \$100 million trigger.

Currently in the United States, reinsurance protection for terrorism risk outside the peak zones is available, and yet some insurers are willing to maintain large net retentions on these remote individual locations that would result in a substantial loss to surplus. Strong terrorism risk management is not limited to just the peak zones, and insurers should not hide behind the theoretically low probabilities of events in remote locations. As with all types of risk, including terrorism, insurers should be managing their exposures down to a reasonable level relative to surplus, avoiding or mitigating any single large exposures.

For primary insurers whose largest direct exposure is less than the \$100 million industry

### Exhibit 3 Potential Rating Limitation by Level of Terrorism Exposure

For insurers with largest direct exposure less than \$100 million.

Largest Net* Exposure as a Ratio to Surplus	Maximum Financial Strength Rating (FSR)	Potential Issuer Credit Ratings (ICR)
< or = 25%	A++	aaa, aa+, aa, aa-
26%-50%	A	a+, a, a-
51%-75%	B++	bbb+, bbb, bbb-

\*Net of reinsurance only

trigger, the insurer's rating may be limited based on the size of the exposure relative to surplus, using **Exhibit 3** as a guideline.

At many locations, an insurer might provide coverage for one type of potential exposure, whereas the remaining exposures are insured by a separate, unaffiliated insurer. For example, workers' comp coverage may be provided by one insurer, but the property exposure is protected by an unaffiliated insurer. In addition, some insurers may only offer protection for a portion of the exposure, such as the upper layers of a property exposure. For insurers that are exposed to only one of the multiple types of coverage at a given location, or that carry only a portion of the total exposure at that location, the insurer must provide evidence that the total industry insured loss at that remote location would exceed the industry trigger to alleviate the concern that the federal backstop would not produce a recovery for the insurer.

The number of ratings expected to be impacted by this methodology is less than 1% of all property/casualty ratings. Any insurer that finds its rating jeopardized by this methodology will need to develop and discuss a corrective action plan with its analyst.

### **Methodology for Professional Reinsurers**

Currently, the SRQ asks for gross zonal aggregate limits exposed to terrorism losses separately for the top 26 cities versus all other cities. It also separates the terrorism exposure into zonal aggregate limits susceptible to conventional attacks versus CBRN attacks. If there is a material exposure to terrorism risk, the responses to these questions form the starting point of discussions with the reinsurer. If the reinsurer shows gross aggregate limits for any single zone in excess of 25% of surplus, the risk will be considered material, and further discussions will center on the loss retentions net of retrocessions. In addition, A.M. Best will need to know the reinsurer's risk appetite, strategy, underwriting guidelines and mitigation program, as well as the reinsurer's ability to capture detailed and accurate information that allows it to monitor and manage the accumulations of risk.

At this writing, the majority of responses collected from reinsurers have indicated

that the risk of loss from terrorism is not material, for both conventional and CBRN attacks. This is primarily because many reinsurers have excluded acts of terrorism from their policies or only offer coverage subject to a small sublimit. However, as the underwriting cycle softens, more reinsurers are including terrorism as a covered peril, especially in cities or locations considered low risk.

For reinsurers that have a material exposure to terrorism risk, A.M. Best will compare the net aggregate limits for the largest concentration within a zone for conventional attacks; the largest net zonal aggregate for CBRN attacks; and the net PML from a natural catastrophe. The largest of these three amounts, after reflecting any reinstatement premiums and the applicable federal tax rate, will be used in the published BCAR.

In addition, reinsurers are subject to the same terrorism stress test as primary insurers, but they use the larger of the two terror estimates mentioned above as the first event, and the natural catastrophe as the second event.

### **Impact of CBRN and Other Types of Attacks in the Rating Evaluation**

Even though A.M. Best has selected the use of a 5-ton TNT truck bomb as the modeled attack for the deterministic loss scenario, A.M. Best still expects all insurers and reinsurers with material exposure to terrorism risk to identify, quantify, monitor and manage their exposure to other types of attacks, both conventional and CBRN. As part of the ERM process, insurers should have a risk catalog of potential terror events and the potential losses created. Composite companies should include their exposures to life and health policies along with their property/casualty exposures when cataloging their potential events and losses. Companies should be willing and able to share these alternative scenarios when discussing their ERM process. A method of accumulating the risks and frequent, systematic reviews of the accumulations and their associated potential losses also are required. Having a risk mitigation plan in place that adequately reduces the insurer's exposure to an acceptable level is imperative. Insurers that do not perform these functions will be considered to have weaker ERM than those that do.

Relying solely on a federal backstop for protection could be problematic, especially for insurers with exposures in the largest cities, where CBRN losses easily could exceed the program cap and limit the actual recoveries. Although the insurer may not be legally obligated to pay claims once the cap is exceeded, the dispute risk could be enormous and costly as policyholders and claimants only receive a partial payment. The best way to avoid this type of potential problem is to enforce sound underwriting guidelines, limiting the amount of coverage on a single risk and preventing geographically concentrated accumulations of those risks.

### Conclusion

The extremely low probability and extremely high severity associated with terrorist attacks has made an insurer's management of its risk profile very challenging, but not impossible. Similarly, reflecting this risk profile in the rating process has become very challenging. Through a series of stresses to the company's

capitalization, A.M. Best can gain an understanding of what could happen to the insurer's capitalization if a terror event were to occur. From this, A.M. Best can assign appropriate financial strength ratings. In addition, A.M. Best will review the company's strategy, risk tolerance, underwriting guidelines and mitigation methods. The level of detail and the frequency of the company's monitoring of its concentrations also will be factored into the evaluation of the company's financial strength.

Users of A.M. Best's financial strength ratings should be aware the ratings reflect the insurer's ability to fulfill its legal obligation to pay claims. Therefore, if a federal backstop caps the amount an insurer is legally obligated to pay, an insurer still may carry a secure financial strength rating, and yet the policyholder or claimant may, at most, receive a partial payment. This is currently the situation in the United States under TRIPRA.

## Appendix A U.S. Locations By Terrorism Risk Tier

### Tier 1 (Highest Risk):

New York, NY  
Chicago, IL  
Los Angeles, CA  
San Francisco, CA  
Washington, DC

### Tier 2 (Higher Risk):

Atlanta, GA  
Baltimore, MD  
Boston, MA  
Buffalo, NY  
Cleveland, OH  
Dallas, TX  
Denver, CO  
Detroit, MI  
Houston, TX  
Las Vegas, NV  
Miami, FL  
Minneapolis/St Paul, MN  
Newark, NJ  
Orlando, FL  
Philadelphia, PA  
Phoenix, AZ  
San Diego, CA  
San Jose, CA  
Seattle, WA  
St Louis, MO  
Tampa/St Petersburg, FL

### Tier 3 (All other):

All locations not listed in Tier 1 or Tier 2.

## Appendix B

## Sample Calculation of Terrorism Charge Used in Published BCAR

	(a)	(b)	(c)	(d)	(e)	(f)	(g)	
Tier	2008 TRIPRA Deductible	Largest Net of TRIPRA Exposure	% Geocoded to Street Address	Geocode Surcharge (%)	Surcharge for Exposures Smaller Than Deductible	Surcharge for Exposures Larger Than Deductible	=(b)+(e)+(f) Largest Exposure Adjusted for Geocode %	
1	\$200,000	\$305,000	82.5	5	0	\$6,750	\$311,750	
2	200,000	260,000	72.5	10	0	9,000	269,000	
3	200,000	237,000	62.5	15	0	10,050	247,050	
Tier	(h) Annual Probability of Large Attack (%)	(i) Conditional Probability of Attack in Tier (%)	(j) =(h) x (i) Probability for Each Location (%)	(k) # Locations Net of TRIPRA Greater than 10% of PHS	(l) =(j) * (k) Locations Times Probability (%)			
1	10	60	6	3	18%			
2	10	30	3	10	30%			
3	10	10	1	80	80%			
Tier	(m) =(g) * (l) Pretax Terrorism Charge	(n) FIT (%)			(o) =(m) * [1- (n)] After-Tax Terrorism Charge	(p) =Max of Col (o) Maximum Terrorism Charge		
1	\$56,115	35			\$36,475			
2	80,700	35			52,455			
3	197,640	35			128,466	\$128,466		
						Terrorism Charge	<b>\$128,466</b>	(q)
						Natural CAT PML (after tax)	<b>\$100,000</b>	(r)
							↓	
						Final PML used in published BCAR (Max of Terrorism Charge & Natural CAT PML)	<b>\$128,466</b>	(s)

(a) From Supplemental Rating Questionnaire, question 46(b).

(b) From largest exposure in each tier of SRQ question 51(a) col (07), 51(b) col (07) and 51(c) col (07).

(c) From SRQ questions 46(e) and 46(f) weighted by net losses of largest exposure in each tier.

(f) Based on insurer co-pay over deductible as percentage of loss = 15%.

(k) From SRQ question 51(a), (b) & (c). Number of locations net of reinsurance and TRIPRA greater than 10% of surplus.

### Appendix C Financial Strength Ratings and Minimum BCAR Scores

FSR	Minimum BCAR
A++	175
A+	160
A	145
A-	130
B++	115
B+	100







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