AMERICAN ACADEMY of ACTUARIES

April 21, 2006

Office of Financial Institutions Policy
Attention: President's Working Group on Financial Markets Public Comment Record
Room 3160 Annex
Department of the Treasury
1500 Pennsylvania Avenue, NW
Washington, DC 20220

Via E-mail to: PWGComments@do.treas.gov

Re: President's Working Group on Financial Markets: Terrorism Risk Insurance Analysis

To the President's Working Group on Financial Markets:

The American Academy of Actuaries' Terrorism Risk Insurance Subgroup (Academy subgroup) thanks the President's Working Group on Financial Markets (President's Working Group) for this opportunity to provide comments in response to the request appearing in the Federal Register of March 7, 2006.

I. Long-term Availability and Affordability of Terrorism Risk Insurance

1.1 In the long-term, what are the key factors that will determine the availability and affordability of terrorism risk insurance coverage? How can these factors be measured and projected?

Academy subgroup response:

The primary insurance cost issue affecting the availability and affordability of terrorism risk insurance coverage is the potential that a single terrorist attack using weapons of mass destruction could cause a huge aggregate loss from a massive number of individual insurance claims. This potential, combined with the difficulty of estimating the likelihood of such attacks and the difficulty of managing an insurer's exposure to such attacks, creates the possibility (in the absence of any national framework for terrorism

risk) that insurers could be forced to curtail their writings of important coverages such as workers' compensation in order to manage their exposure to terrorism risk.

Since September 11, 2001 insurers and others have worked to improve their understanding of terrorism risk. This Academy subgroup was formed to make use of this improved understanding to aid policymakers considering the Terrorism Risk Insurance Act of 2002 (TRIA), the Terrorism Risk Insurance Extension Act of 2005 (TRIEA), or other possible national frameworks for terrorism exposure. Unfortunately, this improved understanding of terrorism risk does not supply easy answers to the complicated questions being asked by insurers or by regulators, legislators and other policymakers. Rather, we now better understand the magnitude of the tremendous uncertainties and estimation problems that face insurers, reinsurers, and other potential suppliers of capital that could be used to finance terrorism risk.

If there is no national framework for terrorism risk exposure, some terrorism insurance coverage will probably be available in the marketplace. However, in that case, the massive uncertainties regarding the anticipated frequencies and severities of potential terrorist attacks make it extremely likely that premiums for terrorism risk insurance will be high and volatile, and that availability of terrorism coverage will be limited. If there is no national framework for terrorism risk, coverages such as workers compensation and group life insurance that are required to cover claims caused by terrorists will become much riskier for insurers and thus more expensive and/or less available over time.

Accordingly, the Academy subgroup has concluded that some national framework for terrorism risk is necessary if terrorism coverage is to be widely and readily available.

The remainder of this response to question 1.1 discusses the basis for the Academy subgroup's opinions and conclusions summarized above. Other public statements of the Academy subgroup include its December 1, 2005 public statement on extending or replacing TRIA and its March 29, 2006 testimony to the National Association of Insurance Commissioners (NAIC) public hearing on terrorism insurance matters.

A. Insurers use special techniques for managing exposure to catastrophes because of the high degree of correlation of such claims, whether the catastrophes are caused by nature or by humans (including events caused intentionally by terrorists).

Attached to this letter as Appendix I is the executive summary of the American Academy of Actuaries' (the Academy's) June 2001 monograph *Insurance Industry Catastrophe Management Practices*. This monograph is a good resource for understanding how insurers manage their exposure to highly correlated potential claims such as those caused by a hurricane, an earthquake, or a terrorist using a weapon of mass destruction. While the fundamental concepts discussed in this monograph apply to terrorism risk, the monograph was written in the pre-September 11 world and does not itself specifically discuss terrorism risk.

Subsequent to September 11, insurers and others have worked to apply these concepts to the management of terrorism risk. Results of these efforts are discussed below.

B. Terrorists with access to chemical, nuclear, biological, and radiological (CNBR) weapons of mass destruction have the potential to cause single-event catastrophic insured losses many times the size of the total insured losses from Sept. 11, 2001. Modelers now estimate that terrorists with such weapons could cause insured losses of $700 billion or more, depending on weapon type and location.

Attached to this letter as Appendix II is a table summarizing the Academy subgroup's insured loss estimates resulting from modeling three different potential terrorist attacks (a large CNBR attack, a medium CNBR attack, and a truck bomb) in four different locations (New York City, Washington, DC, San Francisco, and Des Moines). The Academy subgroup benefited from the assistance of AIR Worldwide in the development of these estimates.

The worst modeled loss (unfortunately, ***not*** a worst case – simply a very bad case) was the large CNBR attack in New York City. Total estimated insured losses were $778 billion which comprised $82 billion for group life insurance and $696 billion for property and casualty (P&C) insurance (including $484 billion for workers' compensation). Modeled losses in excess of $170 billion were estimated for large CNBR attacks in Washington, DC and San Francisco. Modeled losses for a large CNBR attack in Des Moines were over $40 billion, comparable to insured losses from Hurricane Katrina.

The medium CNBR attack resulted in a modeled loss of $447 billion in New York City and close to $100 billion each in Washington, DC and San Francisco. Truck bomb attacks resulted in much smaller modeled insured losses, with the highest being $12 billion in New York City. Unfortunately, it appears more likely that truck bomb attacks may be repeated in various locations. This is no guarantee that CNBR attacks may not be repeated in various locations as well.

Note that if TRIA/TRIEA's "mandatory offer of terrorism coverage" were allowed to expire, insurers could reduce some of these modeled losses by not selling terrorism coverage. However, a substantial majority of the CNBR losses come from the workers' compensation and group life insurance coverages where no terrorism exclusions are allowed. Thus, the only way for insurers to substantially reduce potential workers' compensation and group life insurance losses due to terrorist use of CNBR weapons would be to reduce how much of those coverages they sold at all.

Our responses to questions 1.2 and 1.3 provide more insight into the models used to produce these estimates.

C. It is important to note that the quantification of policyholder and insurer terrorism exposure required by this analysis is extremely difficult. The probabilities

associated with the occurrence of a terrorist attack remain somewhat judgmental and a key source of uncertainty.

Estimates of the potential losses from terrorist events rely on quantitative approaches that have evolved from those used to estimate the potential insured losses associated with natural disasters. This approach is discussed in more detail in our response to question 1.2.

Estimates of the likelihood of any particular type and location of terrorist attack are much more uncertain and are largely based on expert opinion. The historical record is not much use when considering weapons of mass destruction, because the lack of past terrorist use of such weapons is no guarantee for the future. This issue is discussed in our response to question 1.3.

D. If TRIA / TRIEA is allowed to expire without replacement or extension, the insurance industry would be exposed to potential insured losses from terrorism far in excess of those it could sustain without significantly damaging its ability to continue providing all insurance coverages, including traditional homeowners and automobile coverages.

We need to put the potential size of losses into an insurance financial context. The Insurance Information Institute (I.I.I.) reports that policyholder's surplus for the entire property and casualty industry was $414.3 billion as of September 30, 2005. The largest modeled CNBR P&C loss is more than two-thirds higher than the entire property and casualty insurance industry surplus on a pre-tax basis.

There are several issues with this comparison of modeled losses caused by terrorists to industry surplus that should be discussed.

First, the insurance industry as a whole does not pay claims: individual insurance companies do. This means that not all of the insurance industry's capital is available to pay any particular loss. Only the capital of insurers providing coverage triggered by a particular event is relevant. In the case of the largest modeled CNBR event, over 90 percent of the estimated P&C losses were in commercial lines. In this scenario, in the absence of TRIA or some other national framework for dealing with terrorism insurance losses, many commercial lines insurers would be devastated.

Second, these loss estimates are on a primary basis before considering any reinsurance coverage that may be available. However, after September 11, most reinsurance contracts that did not already exclude terrorism coverage were amended to exclude it. The best information we have seen, that provided by the Reinsurance Association (RAA) of America, is that by 2007 perhaps $9 billion of reinsurance coverage for terrorist events may be available to the entire P&C industry, and much of that reinsurance excludes coverage for CNBR events. This amount of reinsurance coverage is not enough to deal

with the massive potential insurance losses that could be caused by terrorist events. Please see our response to question 1.6 for further discussion of reinsurance

Third, we need to briefly discuss federal income tax effects. Recall that the P&C losses in our largest scenario were $696 billion of the total $778 billion. On an over-simplified basis, we could calculate the tax benefit associated with the P&C losses in our largest scenario at 35 percent of $696 billion, or $244 billion. Even on that over-simplified basis the after-tax cost of the P&C losses in that scenario would be $452 billion, which exceeds by nearly $40 billion the P&C insurance industry's entire surplus of $414 billion.

The reality is that the actual tax benefits realized by the P&C insurance industry in this scenario would not even begin to approach the calculated $244 billion. Tax benefits only serve to reduce taxes insurers have paid or otherwise would pay on income. Tax loss carry-backs are limited to two years. The entire P&C insurance industry paid about $15 billion of taxes in 2004, according to the I.I.I. At that rate, even making the overly generous assumption that all taxes had been paid by insurers with terrorism losses, only about $45 billion of the $244 billion calculated tax benefit would be available for collection from the Internal Revenue Service from the taxes otherwise owed for the current and most recent two prior tax years.

Tax loss carryforwards are available for a much longer period, but can only be used to reduce future taxes based on the future taxable income of the insurer who generated them. In the absence of TRIA or some other national framework for dealing with terrorism insurance losses, in our scenario many of the insurers with potential tax loss carryforwards would be insolvent and unable to generate future taxable income, so the tax loss carryforwards would expire as worthless.

In summary, if a large CNBR event occurs in the absence of TRIA or some other national framework for dealing with terrorism insurance losses, many commercial lines insurers would be devastated.

E. Terrorism reinsurance provided by private capital is not able to fill the shortfall the Academy subgroup has identified.

This key point highlights a portion of the discussion above and our response to question 1.6.

The best information we have seen, that provided by the RAA, is that by 2007 perhaps $9 billion of reinsurance coverage for terrorist events may be available to the entire P&C industry, and much of that reinsurance excludes coverage for CNBR events. This amount of reinsurance coverage is not enough to deal with the massive potential insurance losses that could be caused by terrorist events.

F. The Academy subgroup believes that the magnitude of potential insurance claims due to terrorist events makes permanent federal legislation necessary in order to make terrorism coverage widely and readily available.

TRIA/TRIEA caps insurer and government losses (for covered lines) at $100 billion. While the significant increase in insurer deductibles under TRIA/TRIEA means that insurers retain a very large amount of exposure to terrorist events, the cap is very significant when compared to the potential magnitude of losses caused by terrorist use of weapons of mass destruction. We have identified no insurance, reinsurance, or capital markets solution that could finance such potential terrorism losses in the absence of some national framework.

Accordingly, the Academy subgroup believes that the magnitude of potential insurance claims due to terrorist events makes permanent federal legislation necessary in order to make terrorism coverage widely and readily available.

G. The Academy subgroup believes that there should be a mechanism to develop recommendations for a permanent way of dealing with the risk of terrorism.

Given the massive size and uncertainty associated with estimates of insured losses from terrorist use of weapons of mass destruction, any mechanism developed to deal with these losses will be extremely influential on the insurance marketplace. The potential for significant unintended marketplace consequences from incidental aspects of the design of such a mechanism is very high. Therefore, a mechanism for developing recommendations that provides significant opportunity for input from insurance experts is important to minimizing the impact of these unintended consequences.

1.2 What improvements have taken place in the ability of insurers to measure and manage their accumulation of terrorism risk exposures? How will this evolve in the long- term?

Academy subgroup response:

Prior to September 11, few (if any) United States P&C insurers explicitly measured and managed their accumulation of terrorism risk exposures across their whole insurance portfolios. After September 11, insurers realized their need to measure and manage these exposures. The catastrophe risk-modeling firms who already provided tools for measuring and managing P&C insurer portfolio exposures to natural disasters quickly began to develop modifications of these tools designed to address terrorism risks explicitly. Developing these revised tools drew upon engineering studies of weapon destructiveness done for the military as well as expert opinion on the likelihood of varying types and locations of terrorist attacks.

The risk of very large extreme event losses in the face of high uncertainty regarding both

frequency and severity has caused insurers increasingly to adopt underwriting tools by insurers to control the likelihood that aggregate losses from a single event will reach unacceptably high levels relative to capital. These techniques are implemented via new modeling techniques for measuring and quantifying various risk exposure measures.

In order to provide the information needed to control exposure to single-event losses, various techniques are used. These include measurement of accumulations of exposure in a single building or potential terrorist target, and accumulations in circular rings around these targets. For workers compensation' and group life insurance, the exposure is often measured in terms of the death benefit in place at the location times the number of insured lives. Accumulations of this nature are all or nothing. They assume total loss within the defined boundary, and they ignore potential losses outside the boundary.

A more precise measure of risk is a modeled loss, or deterministic loss, using a catastrophe model. The response to question 1.1 illustrates examples of modeled industry losses for selected events. Finding an insurer's maximum loss events allows it to manage exposure in those areas. By using a physical damage and injury model, insurers can estimate property damage as well as injuries and fatalities at each location affected. The resulting losses account for weapon characteristics, as well as the construction type and distance of each exposed location from the event location. The estimate includes the appropriate cost for each class of possible injury, from minor to fatality. Deterministic loss analyses can be performed for conventional as well as CNBR attacks.

These information tools allow insurers to fine tune their risk selection process to encourage geographic diversification and discourage excessive concentrations. For workers' compensation and group life, it shows the concentration risk associated with large potential clients.

Rating agencies, as part of their analysis of an insurer's financial strength, have adopted variations of these methods to support the evaluation of terrorism risk management, examining maximum accumulations and modeled losses and their effects on net loss potential.

Full probabilistic modeling is also available from catastrophe modelers. Probabilistic modeling is a standard risk management approach for natural catastrophe risk management. The models present a large array of possible scenarios, and measure the possible losses for each scenario. Thus, the first level of output is a list of the largest possible modeled losses to the company across the range of modeled scenarios. For terrorism, event frequencies are determined through detailed analyses of the favored methods, capabilities, and known objectives of terrorist organizations. It also addresses possible target diversion due to security measures, such as hardening of government facilities resulting in diversion to more accessible private facilities. Based on a comprehensive set of possible events, the analysis results provide an indication of loss potential at various levels of probability. This allows a single measure of a company's risk against a wide range of possible attacks.

The frequency estimates are developed based on expert opinion using open source material,as classified information regarding terrorism threats that may be useful in quantifying near-term risk is not obtainable, nor can it reflect short-term changes in threat level.

Terrorism models differ in comprehensiveness. While all models attempt to capture all possible terrorist attack possibilities, including weapons and attack locations, there may be unanticipated scenarios that are not included.

While these techniques help individual insurers to understand their loss potential and put processes in place to limit exposure through diversification, they do not provide a solution to limit industry loss in the extreme event situations such as the possible multi-hundred-billion-dollar losses described in the response to question 1.1.

1.3 What improvements have taken place in the ability of insurers to price terrorism risk insurance, including in the development and use of modeling? How will this evolve in the long-term?

Academy subgroup response:

The Academy subgroup response concerns the ability of insurers to estimate costs associated with potential terrorist attacks. Costs are one element considered in an insurer's pricing decision, but pricing per se is outside the purview of this response. This response addresses the development and use of terrorism modeling.

Catastrophe modeling, in general, is based on mathematical representation of potential catastrophes. Models include large catalogs of potential events where the catalog reflects the probability distribution of frequency of events and their parameters. Each event is modeled in terms of the effect on the exposures at risk. A physical model of the event against each building estimates the level of damage, which then results in estimated costs to repair the damage. This represents the severity part of the model. The severity models also include injury components to determine the distribution of injury severities and resulting insurance losses.

For terrorism models, the events are attacks with weapons that may be used by terrorists against potential targets. Target locations come from the types of targets articulated by terrorist groups as being of interest to achieve their goals. Modelers have assembled large databases of such potential targets. Completeness and accuracy verification for target data has been an area of continued development since 2001.

Weapon damage models are largely available due to the engineering and science discipline applied to weapons system engineering over many decades. Modelers have incorporated existing data and models and use new research in that field as it becomes

available. The severity portion of models has underlying uncertainty, but it is well understood and treated within the models.

Terrorism models require detailed and accurate exposure data. This means the enumeration of all the properties and lives covered by the insurer. This includes a need for accuracy in the location of properties, description of the physical characteristics, an estimate of the replacement values, and, if applicable, the schedule for the presence of insured individuals. Improvements in the completeness and accuracy of exposure data have been made since 2001, but it is an area needing additional improvement for many insurers.

It is particularly important to note that the modeling of terrorist events included in this set of responses relates primarily to the potential severity of these events. Though there has been some development of probabilistic terrorism models since the September 11th attacks, the quantification of policyholder and insurer terrorism risk is still extremely difficult due to the uncertainty in frequency estimates. Unlike models used to assess natural catastrophe risk, terrorism models cannot rely on past statistical records or on the application of meteorological or geological science. Instead, they must rely on the intellectual capital of experts who have studied terrorist groups to develop assumptions about the potential frequency of terrorist events. While engineering sciences have built a large body of data relating to building damage and peril intensity, the probabilities associated with the occurrence of a terrorist attack remain somewhat judgmental and a key source of uncertainty. For example, in evaluating tornado risk, there is a historical database consisting of thousands of observations of tornados, and there is a similar database with hundreds of hurricane observations. However, for catastrophic terrorism events in the United States, which TRIA was designed to address, there is only one observation.

Compounding the difficulty of this problem, terrorists can adjust their strategies to increase their chances of success against the efforts being made to mitigate terrorist-caused losses. Hurricane or other natural disaster frequencies may change over time, but – unlike the reactions of terrorist groups - they do not change to deliberately avoid our efforts to mitigate the damage they may cause.

For natural catastrophes, it is in the best interest of government to conduct research and disseminate widely the best available information regarding frequency. Modelers readily use this information. For terrorism, intelligence information is collected by the government in a classified environment. Insurers and modelers do not have access to the most complete information regarding frequency. Thus the frequency estimates have additional uncertainty due to the lack of access to this information.

Modelers have provided tools for insurers to measure concentrations of exposure and possible losses in defined scenarios. This information is being used to manage maximum losses. Probabilistic modeling is also available. Average annual loss data from probabilistic modeling has been used as the basis for advisory loss costs for terrorism

developed by Insurance Services Office (ISO) that have been used in most of the states. While there is considerable uncertainty in the frequency estimates, relative loss estimates across locales have provided credible estimates of relative risk useful in portfolio management based on our current understanding of the terrorist threat.

One of the most important contributions of the terrorism modeling efforts has been the identification of potential attack scenarios using CNBR weapons that could cause insured losses of many hundreds of billions of dollars. While these scenarios represent the tail of the probability of loss distribution (high potential loss, low frequency), their existence demands that risk management be applied in case such events occur. These events are hundreds of times more severe than the modeled average annual loss. Even if these assessments of frequency or severity were varied substantially, the magnitude of the potential losses from these events far exceeds the ability of the industry to cover them.

The events of September 11 made it clear to the insurance industry that there is considerably more uncertainty concerning potentially significant losses due to terrorism than most industry participants had previously been aware. Reactions of participants in the industry, starting with the almost immediate and almost complete disappearance of voluntarily sold reinsurance coverage for terrorist events, were key factors motivating the TRIA legislation in 2002.

As is noted in this discussion, something has been learned since September 11 about modeling an insurer's exposure to catastrophic losses caused by terrorism, but that knowledge is less complete and more uncertain than our knowledge about other types of catastrophic losses.

1.4 How, if at all, were primary insurers' pricing decisions affected by the anticipated expiration of TRIA at the end of 2005, particularly for insurance policies extending into 2006 that cover terrorism risk? What role did the pricing and availability of reinsurance play in those decisions?

Academy subgroup response:

Again, the Academy subgroup's response to this question concerns anticipated costs associated with terrorism risk which is an important element of pricing decisions. Individual insurer pricing decisions are outside the scope of the Academy subgroup's response.

The following illustrative examples of coverage and cost options available to insurers facing the expiration of TRIA are based upon materials produced by ISO, an advisory organization for loss costs and policy forms.

In anticipation of the termination of TRIA at the end of 2005, options for conditional exclusions and limitations were made available to insurers before the 2005 policy year.

There were three versions of the conditional forms -- total exclusion of conventional weapon terrorism above a $25 million event threshold (but with no threshold on CNBR events); exclusion of CNBR terrorism only; sub-limit on terrorism above a $25 million event threshold, subject to underlying policy provisions. The conditional provisions were structured to limit terrorism coverage under the policy in the event of termination of TRIA or extension of TRIA without a mandatory participation requirement and with a backstop less favorable to the insurer. The conditional forms were approved in 51 of 54 jurisdictions (not approved in Florida, Georgia and New York).

Advisory rating information was made available to insurers in support of the aforementioned conditional options, as well as for the option of covering terrorism subject to underlying policy provisions. The advisory rating information was provided for TRIA program years and for the post-TRIA period. Post-TRIA advisory rating information recognizes the absence of federal participation in losses. Since rating took place before the fate of TRIA was decided, rating options enabled development of a provisional premium that could have entailed additional or return premium upon the termination or extension of TRIA.

The same conditional options and rating options are being made available for the anticipated end-of-2007 termination.

1.5 What role do mitigation efforts related to terrorism risk play in an insurer's underwriting and pricing decisions? How will this evolve in the long-term?

Academy subgroup response:

Insurance mechanisms identify and place a cost on risk. Ideally, successful insurance systems will reward loss mitigation activities with premium reductions commensurate with the expected cost reductions due to mitigation. By comparison, the premium for unmitigated activities will be higher. There are several examples of mature insurance systems which provide strong mitigation incentives to the market. Workers' compensation has developed an extensive risk classification system, a sophisticated experience rating plan, and retro plans to provide a clear relationship to the insured between potential losses and premium costs. Homeowners insurers in areas prone to catastrophes provide incentives and discounts for structures built to comply with stronger building codes or that have been retrofitted to withstand hurricanes or earthquakes. These systems are successful because the insurance system has accumulated a large volume of information on the effect of various mitigation activities that protect against threats which are stable over time, so that insurer premiums send economic signals to insureds on the benefits of particular mitigation activities.. Insureds then have an economic incentive to invest in mitigation, lowering overall losses to the system.

Terrorism poses unique challenges that make it far more difficult for insurers to fine tune underwriting and pricing practices to reflect mitigation activities. Insurers lack the type of

detailed data on the effect of mitigation measures available in other lines. Further, terrorists can change their behavior to defeat mitigation efforts in ways natural disasters cannot. (A hurricane will not change course to avoid an area with homes built to code.) These factors make it more difficult for the insurance system to encourage mitigation to the same extent it can in other lines of business.

Insurer clients may employ terrorism risk mitigation strategies, such as placing concrete barriers in front of trophy targets to discourage truck bombs. The insurance system will take such information into account when underwriting and pricing risks. The existence or lack thereof of a federal terrorism program should not interfere with the private market's incentives to encourage mitigation. The large retention and financial exposure that insurers retain under TRIA and TRIEA provide incentives to encourage mitigation.

In the long term, the evolution of understanding of which mitigation efforts are effective will allow for more refined underwriting and pricing. Unfortunately, the nature of the terrorist threat makes it much more difficult to provide strong mitigation incentives in many locations. For example, the threat of terrorist activity in a small midwestern town might currently be perceived as low, meaning that the insurance system might not provide strong economic incentives for expensive investments in mitigation. However, terrorist strategies might change much more rapidly than the insurance system could react. Contrast this to a natural disaster, where there is a fairly clear way of identifying places prone to loss that does not change radically from year to year.

1.6 What is the current availability of reinsurance to cover terrorism risk? Please distinguish by line or type of insurance being reinsured and on what basis (treaty or facultative). How will this evolve in the long-term?

Academy subgroup response:

The Academy subgroup is not in a position to provide a specific market analysis of reinsurance. We can, however, offer several general observations.

First, we have seen no evidence that there exists private reinsurance capacity to address the type of extreme events the Academy subgroup has modeled (See response to question 1.1). Several of those events are an order of magnitude larger than reported reinsurance capacity even under TRIA or TRIEA. Without a national framework for terrorism insurance, certain modeled events could be two orders of magnitude greater than reported reinsurance capacity.

Second, standard reinsurance contract language often excludes terrorist acts covered by TRIA or the 2005 extension, and all "biological, chemical, or nuclear pollution or contamination."

Reinsurance markets face the same difficulties as primary insurers in pricing coverage in terms of the state of the art of catastrophe modeling tools. Currently, some observers have suggested that the catastrophe risk modeling tools for natural disasters could be improved, based on the model's projections in advance of the actual 2004 and 2005 hurricane seasons. The available terrorism models are subject to more uncertainty that those for hurricanes. Thus, in the short term reinsurers face significant challenges in quantifying their exposure to terrorism losses. This reinsurer uncertainty will serve to limit available capacity.

In the long term, the amount of private reinsurance capacity will be related to the confidence that the markets develop in their pricing tools and their understanding of the risk. It would require a very significant increase in capacity for the private market to absorb the risk now covered by TRIA even under TRIA's $100 billion cap. Given current market conditions in the wake of recent hurricanes, it is difficult to see how the markets will be able to generate significant additional terrorism reinsurance capacity in the short term. Substantial capital has been raised to replace reinsurance capital lost to the hurricanes of 2005, but little, if any, of that capital is available to cover terrorism risk.

One final consideration is the degree of stability public policy makers want for consumers. Reinsurance markets are subject to short-term disruption manifested as decreased reinsurance availability and substantially increased cost. This is occurring now with regard to property catastrophe reinsurance. Terrorism reinsurance markets may be subject to even greater short-term instabilities due to the uncertain nature of the terrorist threat and the enormous potential magnitude of losses. While the Academy subgroup takes no position on what value public policy makers should place on market stability, we do note that there are several other examples of government frameworks designed to address financial market instability, such as the Federal Reserve System.

1.7 At what policyholder retention levels are insurance programs being structured to cover terrorism risk; and, with regard to insurers, how are reinsurance programs likewise being structured? Please comment on the availability and affordability at each level.

Academy subgroup response:

Details of actual agreements reached in the marketplace are outside the scope of the Academy subgroup's response.

1.8 In the long-term, what are the key factors that will determine the amount of private-market insurer and reinsurer capacity available for terrorism risk insurance coverage? How will this evolve in the long-term? Please comment on potential entry of new capital into insurance markets.

Academy subgroup response:

Conceptually, the factors discussed in our response to question 1.1 apply to reinsurers as well as insurers. In the absence of a national framework for terrorism risk, reinsurance for terrorism risk is likely to be volatile, expensive, and of insufficient quantity.

There is one significant difference between the reinsurance and insurance marketplaces in the terrorism insurance context. Reinsurance coverages in general are not mandated by law or regulation to cover any particular perils. Thus, reinsurers are free to draft contracts that exclude coverage for claims their primary company clients must pay. On the one hand, this allows the reinsurers more power to manage their exposures, as their basic business model tends to attract substantial concentration risk. On the other hand, this means that primary companies cannot rely on laying off risks they may have felt "forced" to take on.

Again assuming the lack of a national framework for terrorism risk, note that we see no prospect, even in the long term, of a significant reduction in the uncertainty associated with estimating terrorism exposure. Accordingly, we see no prospect of any rapid increase in the amount of private capital invested in terrorism risk reinsurers.

1.9 To what extent have alternate risk transfer methods (e.g., catastrophe bonds or other capital market instruments) been used for terrorism risk insurance, and what is the potential for the long-term development of these products?

Academy subgroup response:

The Academy subgroup's responses have benefited from the expertise of AIR Worldwide. AIR Worldwide has directly supported a large portion of the transactions for raising risk capital through catastrophe bonds, and has modeled virtually all of the catastrophe bonds ever issued as part of services provided to investors. This response reflects knowledge obtained through those experiences.

As far as we are aware, the financial industry has not yet issued a cat bond (or individual tranche) solely on the basis of terrorism risk. (The FIFA World Cup bond covered the potential cancellation of the event, which could be caused by a number of possibilities, terrorism being only one.) We have heard skepticism from both rating agencies and investment banks about the market being ready for a terrorism bond.

Catastrophe bonds involve participation by several parties. Investors offer capital seeking a diversification from market risks and potentially a higher return in exchange for added risk. Quantification of the risk is of utmost importance. Like reinsurance contracts, pricing is based on detailed probabilistic loss analysis. Risk for catastrophe bonds is quantified by catastrophe modeling companies. Bonds are rated by rating agencies. This includes evaluation of the models and the quality of the data used in the models.

Investors do not generally have the risk analysis expertise for extreme events that is resident in insurance companies and reinsurance companies. Therefore, they look to the practices and risk assessments used by those companies as well as the ratings provided by the rating agencies for guidance. The rating agencies have indicated no willingness to use probabilistic terrorism loss models for ratings.

Citing the same risk uncertainties cited by insurers and reinsurers regarding terrorism, as well as the fact that terrorism catastrophe bonds are not able to be rated, investors have expressed little appetite for such investment vehicles to date.

Thus, the issues limiting the availability of reinsurance for terrorism also limit the use of alternative risk transfer methods.

1.10 To what extent have captive insurance companies been used for terrorism risk insurance, and what is the potential for the use of captive insurers to insure against such risk long-term?

Academy subgroup response:

The Academy subgroup is not aware of any captive that has been set up specifically to provide terrorism coverage.

TRIA and TRIEA require the offer of terrorism insurance on the same terms and conditions as for other perils covered by policies in the lines of insurance subject to these acts. To the extent a captive is subject to the TRIA/TRIEA mandatory offer provisions, and their insureds (owners) opt for the coverage, the captive is required to provide such coverage and is covered by the federal backstop.

An entity whose purpose is to cover the exposure of a single entity will need the availability of some mechanism to share/spread that risk. This is especially true for a catastrophic exposure. In the absence of readily available reinsurance, an aggregate cap and/or a pooling arrangement (such as might be provided under a national framework for terrorism risk), it is unlikely that captives would be set up specifically to provide terrorism coverage.

Note, however, that while TRIA/TRIEA is in effect, a captive that had already been set up to handle workers compensation exposure could have access to recoveries for terrorism losses at levels considerably lower than had the same premium been written through a standard insurer. This happens because the standard insurer's terrorism deductible is increased due to other workers compensation premium it writes and to premium it writes in other lines covered by TRIA/TRIEA.

1.11 Have state approaches made coverage more or less available and affordable, such as through permitted exclusions and rate regulation? To what extent will the long-term availability and affordability of terrorism risk insurance be influenced by state insurance regulation? Please comment on state approaches to ensure the continued availability and affordability of terrorism risk insurance in the absence of the TRIA Program being in- place (include state approaches after September 11, 2001 and before TRIA became law on November 24, 2002, as well as state approaches in preparation for the expiration of the TRIA Program).

Academy subgroup response:

TRIA and TRIEA mandate that terrorism insurance coverage be made available for covered lines, so that state actions currently have no impact on the availability of terrorism coverage for such lines.

Some states have disapproved original insurer terrorism rate filings and later approved those filings when the rates had been reduced. Given the requirement of mandatory offer, such a state action has the effect of making terrorism insurance coverage more affordable than it would otherwise be.

However, on expiration without replacement of TRIA and TRIEA, insurers would no longer be required to offer terrorism coverage to every client for the underlying coverage. In such a case, state terrorism rate disapprovals could operate to reduce, perhaps considerably, the availability of terrorism insurance.

Note also that certain coverages, such as workers' compensation, may be defined by state law in a manner that implicitly or explicitly provides for coverage of the peril of terrorism. In such a case, an insurer wishing to limit its accumulation of terrorism exposure would have no tool to do so other than avoiding the underlying exposure (workers' compensation in this case).

If a state did not approve exclusions for terrorist attacks not covered by TRIA/TRIEA, such a state action could expose insurers to very large losses and as in the workers' compensation example above potentially affect the availability of the underlying non-terrorism coverage. A state's failure to approve terrorism exclusions could affect the financial solidity of the insurer.

1.12 What are the differences in availability and affordability of terrorism risk insurance between the 1icensed/admitted market and the non-admitted/surplus lines market, and, if so, to what degree are those changes attributable to the degree and manner in which each market is regulated?

Academy subgroup response:

Given the "mandatory offer" provision of TRIA/TRIEA, there can be no "availability" problem for terrorism risk insurance for risks written by either market.

1.13 What are the differences in availability and affordability of terrorism risk insurance coverage for losses at US locations as compared to such coverage for losses at non-US locations?

Academy subgroup response:

The Academy subgroup has no information with which to make a response to question 1.13.

II. Long-term Availability and Affordability of Group Life Insurance Coverage

2.1 What impact, if any, does terrorism risk have on the availability and affordability of group life insurance coverage to the policy holder (e.g., employer) and certificate holders (e.g., employees)? How will this evolve in the long-term?

Academy subgroup response:

The Academy subgroup is unaware of any significant current impact of terrorism risk on the availability and affordability of group life insurance for policyholders and certificate holders. However, we believe it is quite possible that there will be a significant long-term impact. The lack of current impact exists for several reasons.

First, the unique nature of terrorism risk means that it is very difficult to quantify the risk or to determine appropriate pricing actions. Little historical data is available due to the scarcity of large-scale attacks, and while it is possible to make some estimates of the potential severity of terrorist attacks for very specific scenarios, projecting the frequency of such attacks is considerably more uncertain. Group life has historically been inexpensive relative to the other coverages it is commonly marketed with. Insurers may well be concerned that even modest price increases could have a material impact on the decision to purchase this coverage, since many employers might opt to reduce or eliminate their group life plans instead of paying the higher premiums. Group life insurers are concerned about reducing the group life market by increasing premiums based on essentially one event (September 11), even though the potential of additional events is well established.

Second, the consumer impact of terrorism risk on the group life insurance industry will emerge more slowly than in the property/casualty industry for many reasons:

- Property/casualty insurers were hit harder than group life insurers by the events of September 11, creating a greater sense of urgency for immediate action.

- Group life mortality has historically been quite stable, and group life insurers are accustomed to pricing and managing their business through the analysis of long-term trends. They are hesitant to disrupt their market by raising premiums and restricting availability in response to a single catastrophic terrorist event, when the probability of recurring events is so difficult to predict. Many carriers may feel that, in the absence of catastrophe reinsurance for terrorism, their only other option to deal with terrorism risk is to exit the group life business at tremendous opportunity cost as discussed below.

- Group life is a relatively small portion of the overall employee benefit market, which includes coverages such as disability, dental, medical, and pensions. Group life insurers may fear that a sudden change to the premiums or benefits for

their group life business could cause employers to seek other carriers not only for their group life business, but also for these other, larger, product lines.

Because group life insurers are not permitted to offer coverage with terrorism exclusions and have a very difficult task in estimating the cost of the terrorism risk, they have perceived their choice as either (1) continuing to provide coverage for terrorism without collecting adequate premium for the true cost of terrorism risk, (2) ceasing to offer coverage to those market segments perceived to be at a high risk for terrorism, or (3) exiting the group life market entirely. Companies dislike exiting markets, and the process poses significant regulatory, financial, and public relations challenges. Once such a decision has been reached, however, it is even more difficult for a company to re-enter a market, because it will no longer have the distribution network, the infrastructure, or the market credibility it had before its exit. As a result, company decisions to exit the group life market will be taken slowly. However, in the absence of some risk-sharing mechanism, some companies will seriously consider such a step, especially if major terrorism costs were to occur again.

2.2 To what extent is an insurer's decision to issue group life coverage influenced by aggregation or accumulation risk in certain locations? What steps have group life insurance providers taken or do they plan to take to offset any aggregation or accumulation risk?

Academy subgroup response:

The aggregation of risk in certain locations is a fundamental characteristic of group life insurance because the groups insured are commonly employees of a company whose workdays are concentrated in one or a few physical locations. Since the events of September 11, many companies have begun paying much closer attention to the concentration of risk in their group life business. According to a 2005 LIMRA International (LIMRA) survey on the group life catastrophe reinsurance market, approximately one-third of responding companies indicated that they had restricted coverage to some groups based on location. Specific examples cited by the respondents include major metropolitan areas such as New York, Chicago, and Washington, DC, as well as high-profile buildings in those and other locations. In addition, some groups with an industry or occupation that will have a higher probability of being involved in the response to a terrorist attack (police/fire) are being restricted or declined by some insurers. Although such underwriting declinations have been infrequent, we understand they have occurred.

2.3 Has terrorism risk made group life coverage less affordable to the policy or certificate holder? Have group life insurance rates increased or decreased as compared to rates before and since September 11, 2001?

Academy subgroup response:

As indicated in the response to question 2.1, there is little evidence to suggest that group life has become less affordable to the policy or certificate holder as the result of terrorism risk, although it is likely that this is true for isolated cases. According to data published by the American Council of Life Insurers (ACLI) for the entire group life insurance industry, the average rate per $1000 of coverage decreased from $4.18 in 2001 to $3.49 in 2003, and then increased to $3.63 in 2004. It is not possible to isolate the impact of terrorism risk on these premium changes, which are also heavily affected by factors such as the distribution of product types (e.g., whole life versus term life) and mortality trends other than terrorism.

2.4 Please explain how group life insurance coverage may be bundled with other coverages and benefits provided through an employee-benefits program, and how group life coverage is priced, either separately or collectively, through such programs. Please describe any effects competition has on such pricing.

Academy subgroup response:

It is extremely common for group life to be sold in conjunction with several other group products including long term disability, short term disability, dental, and medical. Surveys have shown that most carriers will offer a discount on their group life rates if the products are sold in conjunction with other products. There are several justifications for this:

- improved persistency,
- less selection risk if an employer is looking for multiple coverage versus stand-alone life,
- sales goals on the other group products that are sometimes less marketable,
- expense savings as some limited economies of scale are achieved in policy issuance and maintenance.

Prices are adjusted only for package discounting at the employer level, never at the employee level. For example, in a voluntary setting the group life rates are the same for all employees regardless of how many different product types they buy. Competition is the main driver for the third point above. Potential employer clients who lack these employee benefits are increasingly rare. The market has hit a maturity stage where an insurer that wants to increase its market share must effectively decrease a competitor's market share. The importance of obtaining several product lines on a single group becomes enormous. It is also the reason that profit margins have stayed extremely thin on group life, whose results are typically very stable, but potentially extremely volatile.

2.5 Are group life providers voluntarily providing coverage for loss of life arising out of or resulting from acts of terrorism, or is coverage mandated by any state or

federal laws? Are group life providers prohibited by law from excluding terrorism risk from group life insurance policies?

Academy subgroup response:

The Academy subgroup understands that group life insurers provide coverage for loss of life from terrorism because no exclusion for this coverage is or has been allowed, whether by operation of state insurance laws (e.g., California) or by state insurance regulatory decisions.

2.6 Has terrorism risk affected segments of the group life market differently, such as in the case of small/medium sized employers, and if so, why?

Academy subgroup response:

The Academy subgroup does not have market information that pertains to the treatment of small or medium sized employers.

As described in the response to question 2.2, the LIMRA survey on catastrophe reinsurance indicated that terrorism risk has had a greater impact on customers in large metropolitan areas and high profile buildings. One respondent to the survey also indicated that it had placed some underwriting restrictions on the availability of group life insurance to "first responders" such as police and fire personnel.

2.7 In the long-term, what are the key factors that will determine the availability and affordability of terrorism risk insurance coverage for group life insurance?

Academy subgroup response:

In the long run, the availability of meaningful and affordable catastrophe reinsurance coverage for group life insurers will be a key factor in determining the availability and affordability of group life insurance (which, by law or regulation, may not exclude coverage for terrorism risk) for consumers. The LIMRA survey showed that, more than four years after the events of September 11, 2001, there is still insufficient catastrophe reinsurance capacity (even including pooling arrangements) to protect insurers against large-scale terrorist attacks. The widespread availability of catastrophe reinsurance before that date meant that the losses from that event were spread efficiently among a large number of insurers and reinsurers. The decreased use of catastrophe reinsurance coverage today, due to availability and affordability issues, means that a single terrorist attack could pose solvency issues for group life insurers, and could lead many companies to stop offering group life insurance altogether.

In other words, it appears likely that group life insurance that covers terrorism risk could become substantially less available and less affordable, assuming group life insurance remains outside any national framework for terrorism risk. Group life insurance was covered neither by TRIA or by TRIEA, and at some point group life insurers may stop acting as if it were.

III. Long-Term Availability and Affordability of Insurance Coverage for Chemical, Nuclear, Biological, and Radiological (CNBR)~ Events caused by Terrorism

3.1 What is the current availability and affordability of coverage for CNBR events, and for what perils is coverage available, subject to what limits, and under what policy terms and conditions? Is there a difference in the availability and affordability of coverage for CNBR events caused by acts of terrorism?

Academy subgroup response:

TRIEA clearly provides that coverage for terrorism is subject to the terms and conditions of the underlying policy. Thus, under the current federal program, coverage for CNBR events caused by terrorists depends on whether the underlying policy would have covered the peril even absent terrorist involvement.

Under commonly used workers' compensation and group life policies, no exception applies to the applicability of coverage if the loss is due to a CNBR event. Such coverage would be available up to the full limits of the policy.

For property policies, the situation is more complicated. Commonly used property policies have various provisions that exclude coverage for nuclear reaction, radiation or contamination. However, damage from certain perils (fire, for example), that results from a nuclear reaction, may be covered. Regarding coverage for biological and chemical events, property policies often contain specific exclusions that could apply in the event of a terrorist attack involving these perils that would bar coverage. Whether coverage applies would depend on the specific facts associated with a particular loss event and the coverage stipulations included in the policy. If such coverage is found to apply it would usually be available up to the full limits of the policy.

For liability coverage, also, whether coverage applies in the event of a CNBR attack would depend on the coverage stipulations included in the policy and the specific facts associated with the event.

In a post-TRIEA environment, insurers would have available specific endorsements to exclude coverage for CNBR events initiated by terrorists. Industry use of such endorsements would reflect each insurer's evaluation of the risk/reward trade-off associated with coverage of this peril.

3.2 What was the general availability of coverage for CNBR events prior to the terrorist attack of September 11, 2001? To what extent, subject to what limits, and for what perils was coverage available? Did it cover acts of terrorism?

Academy subgroup response:

Before September 11, if the underlying policy provided coverage for these perils, losses from these perils caused by terrorists were often not excluded.

In particular, workers' compensation coverage generally included all perils that could injure workers on the job, so insurers were implicitly providing CNBR coverage.

Note, however, that although contractually insurers were providing this coverage in many cases, it was not being provided on an intentional basis. Before September 11, insurers gave little consideration to the possibility of terrorist acts that could cause insured losses of the magnitude that now appears possible.

3.3 If coverage for CNBR events caused by acts of terrorism is available, please describe generally to what extent (i.e., limits, locations, exclusions, etc.) for what kinds of insurance and from what types of insurers (i.e., large/ small, admitted/surplus lines, etc.). How will this evolve in the long-term?

Academy subgroup response:

Again, for lines of business covered by TRIA and TRIEA, insurers are mandated to make available coverage for losses caused by foreign terrorists for the same perils covered by the underlying policy.

We interpret the question about the long-term to require an assumption that TRIA and TRIEA expire without replacement. In such a case, and given the small amount of reinsurance coverage available for CNBR events, insurers may be forced to manage their terrorism exposure without the benefit of either reinsurance or a national framework (including the $100 billion cap on insured terrorism claims) for insured terrorism risk. In such a scenario, it appears likely that insurers will only be able to attain acceptable levels of risk exposure by providing considerably less coverage for terrorism risk than they are providing today.

3.4 To what extent is terrorism risk coverage available and affordable for nuclear facilities and for chemical plants, manufacturers, and industrial chemical users?

Academy subgroup response:

Details of actual agreements reached in the marketplace are outside the scope of the Academy subgroup's response.

3.5 To what extent, both prior to and since September 11,2001, have various states allowed insurers to exclude coverage for CNBR events? Please comment on requirements for workers' compensation and fire-following coverage.

Academy subgroup response:

Again, workers' compensation is generally defined by state law to provide coverage for all perils so that no CNBR exclusions have been allowed. Please see our response to question 3.1 for further discussion of the availability of coverage for CNBR events.

3.6 It appears that some insurers are unwilling to provide coverage for CNBR events caused by acts of terrorism even with the federal loss sharing provided by the TRIA Program. Why would this be the case given that TRIA limits an insurer's maximum loss exposure?

Academy subgroup response:

Individual insurer decisions to offer or not offer coverage are beyond the scope of the Academy subgroup's response.

We will note, however, that insurers writing workers' compensation and group life insurance are currently providing large amounts of coverage for CNBR events. Please see our response to question 1.1 for more information on the magnitude of such coverage.

We will also note that under TRIA/TRIEA individual insurer terrorism deductibles can be very large. Where insurers have the option not to provide CNBR coverage on the underlying policy, they may evaluate the potential premium for providing CNBR coverage as incommensurate with the exposure being taken on.

3.7 In the long-term, what are the key factors that will determine the availability and affordability of terrorism risk insurance coverage for CNBR events?

Academy subgroup response:

CNBR events can cause the largest losses due to terrorism risk as discussed in our response to question 1.1.

Given the magnitude of potential claims due to CNBR events and the tremendous uncertainty associated with evaluating the likelihood of such events, there are essentially two long-term scenarios.

1. Absence of a national framework for terrorism insurance: In this case there is likely to be a limited and volatile market for terrorism coverage for CNBR events. To the extent state laws and regulations mandate inclusion of coverage for CNBR events caused by terrorists, these requirements are likely to reduce availability of standard coverages. Even so, a terrorist attack using CNBR weapons in this scenario has the potential to cause massive insolvencies of standard insurers, complicating the task of

national recovery from such a devastating event.

2. With a national framework for terrorism insurance: If properly designed, a national framework would allow terrorism coverage to be widely available. While the underlying uncertainty about the frequency and severity of terrorist events would remain, the volatility of premiums for this coverage given a national framework should be considerably less that in the above scenario.

The Academy subgroup would be glad to provide further assistance or additional information to the President's Working Group upon request.

Very truly yours,

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Attachments (2 Appendices)

AMERICAN ACADEMY OF ACTUARIES

The American Academy of Actuaries is a national organization formed in 1965 to bring together, in a single entity, actuaries of all specializations within the United States. A major purpose of the Academy is to act as a public information organization for the profession. Academy committees, task forces and work groups regularly prepare testimony and provide information to Congress and senior federal policy-makers, comment on proposed federal and state regulations, and work closely with the National Association of Insurance Commissioners and state officials on issues related to insurance, pensions and other forms of risk financing. The Academy establishes qualification standards for the actuarial profession in the United States and supports two independent boards. The Actuarial Standards Board promulgates standards of practice for the profession, and the Actuarial Board for Counseling and Discipline helps to ensure high standards of professional conduct are met. The Academy also supports the Joint Committee for the Code of Professional Conduct, which develops standards of conduct for the U.S. actuarial profession.

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The Subgroup recognizes Jack Seaquist and Jeremiah M. Downing, CPCU, for their participation in the development of these responses. The Subgroup thanks AIR Worldwide Corporation and ISO for the provision of modeling and technical resources used in preparing these responses.

First attachment for response to question 1.1

Insurer Catastrophe Management Practices

Following are the bullet points from the Executive Summary of the monograph entitled "Insurance Industry Catastrophe Management Practices". The complete monograph is available on the Academy website, www.actuary.org.

- Catastrophe exposures place special demands on insurer capitalization and require a distinct risk management approach. The risk management process for an insurer must integrate all risk management strategies of the insurer, not just a single risk, such as catastrophe risk. The interaction or covariance (versus independence) of the various risks a company faces is an important factor in determining the company's total capital requirements.
- For property and casualty insurers, catastrophes are defined as infrequent events that cause severe loss, injury, or property damage to a large population of exposures.
- Whereas most property insurance claims are fairly predictable and independent, catastrophe events are infrequent and claims for a given event are correlated. The insurance process, if left unmonitored during lengthy catastrophe-free intervals, could produce increasing concentrations of catastrophe exposure.
- Catastrophes represent significant financial hazards to an insurer, including the risk of insolvency, an immediate reduction in earnings and statutory surplus, the possibility of forced asset liquidation to meet cash needs, and the risk of a ratings downgrade.
- Insurers manage catastrophe risk through a continuous learning process that can be described in five steps. The steps are identifying catastrophe risk appetite, measuring catastrophe exposure, pricing for catastrophe exposure, controlling catastrophe exposure, and evaluating ability to pay catastrophe losses.
  - **Identifying catastrophe risk appetite -** An evaluation of catastrophe risk appetite gives underwriters a guideline for determining whether catastrophe risk in the insured portfolio is within acceptable limits.
  - **Measuring catastrophe exposure** - The objective of measuring catastrophe exposure is to be aware of the company's current exposure to catastrophes, both in absolute terms and relative to the company's risk management goals.
  - **Pricing for catastrophe exposure** - In setting rates for catastrophe insurance coverage, the general trend is away from using a long historical experience period, toward the application of catastrophe models to current or anticipated exposure distributions. The shortcomings of using historical premium and loss experience are clear, and catastrophe modeling has been widely adopted in making rates for hurricane and earthquake.

  - **Controlling catastrophe exposure** - For various reasons, insurers may decide they have a need to control or limit catastrophe risk. Usually this results in reducing exposure in segments where capacity is exceeded, and using reinsurance or capital market instruments to transfer exposure to someone else.
  - **Evaluating ability to pay catastrophe losses** - Catastrophe claim payments are funded through normal operating cash flow, asset liquidation, debt financing, or advance funding from reinsurers.

- Actuarial standards exist for appropriate application of catastrophe models. Also, to help regulators evaluate use of the models in making rates, the Catastrophe Insurance Working Group of the NAIC published the *Catastrophe Computer Modeling Handbook* in January 2001.
- Generally, the liquidity (or illiquidity) of an insurer after a catastrophe does not cause insolvency. Rather, it is the magnitude of the event relative to company surplus. Insurers must strike a balance between the benefits of being prepared for low-probability catastrophes and the cost of pre-event preparations.
- There is no one catastrophe risk management procedural template that applies to all insurers. However, the conceptual elements are the same for any property and casualty insurer.
- Reinsurance is the traditional method used by insurers to transfer risk, but capital markets are a growing source of alternate capacity. Capital market products developed to date can be grouped into three categories: insurance-linked notes and bonds, exchange-traded products, and other structured products.
- Catastrophe risk management for reinsurers is similar to that of a primary company. For a reinsurer, the challenges are to obtain adequate catastrophe exposure information from ceding companies, to accurately measure catastrophe exposure aggregations across multiple ceding companies, and to price for the exposure.
- Insurer catastrophe risk management practices are relevant to certain questions of public policy. Examples include the amount of insurer capital, whether insurer capital needs to be segregated for catastrophe purposes, whether to encourage pre-event funding, the tradeoffs between availability and affordability, the extent of governmental involvement in the market place, and potential over-reliance on guaranty funds.
- Policy-makers considering actions designed to affect either catastrophe coverage availability or the solvency of insurers exposed to catastrophe claims can use the five step catastrophe risk management approach to anticipate market effects of the proposals they are considering. Generally, policy actions have more than one consequence, and this framework can help to anticipate secondary (and sometimes unintended) consequences.

Appendix II

Second attachment for response to question 1.1

The following table summarizes the modeled terrorism events discussed in the testimony of the American Academy of Actuaries Terrorism Risk Insurance Subgroup. The loss estimates are pre-tax and before any reinsurance considerations.

Summary of Results – Insured Loss Estimates in $Billions

Scenario	Line of Business	New York City	Washington, DC	San Francisco	Des Moines
Large CNBR	**Total**	**778.1**	**196.8**	**171.2**	**42.3**
	Auto	1.0	0.6	0.8	0.4
	Commercial Property	158.3	31.5	35.5	4.1
	Residential Property	38.7	12.7	22.6	2.6
	Workers' Compensation	483.7	126.7	87.5	31.4
	General Liability	14.4	2.9	3.2	0.4
	Group Life	82.0	22.5	21.5	3.4
Medium CNBR	**Total**	**446.5**	**106.2**	**92.2**	**27.3**
	Auto	0.2	0.1	0.2	0.1
	Commercial Property	77.8	15.7	17.1	2.0
	Residential Property	10.3	3.1	6.9	0.4
	Workers' Compensation	313.2	71.6	50.8	21.8
	General Liability	7.3	1.5	1.6	0.2
	Group Life	37.7	14.2	15.6	2.9
Truck Bomb	**Total**	**11.8**	**5.5**	**8.8**	**3.0**
	Auto	0.0	0.0	0.0	0.0
	Commercial Property	6.8	2.1	3.9	1.2
	Residential Property	0.0	0.0	0.0	0.0
	Workers' Compensation	3.5	2.8	3.9	1.5
	General Liability	1.2	0.4	0.7	0.2
	Group Life	0.3	0.2	0.3	0.1

The American Academy of Actuaries Terrorism Risk Insurance Subgroup appreciates the contribution of assistance from AIR Worldwide in the development of these estimates.