

Proposed NBCR Changes to TRIEA and Their Impact on Insurers' Terrorism Exposure



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Introduction

The U.S. recently marked the sixth anniversary of the September 11th terrorist attacks. The events of that day instantly changed the way insurers and reinsurers view catastrophe risk. Recognizing the threat to the industry represented by the magnitude of potential losses, President Bush signed into law the Terrorism Risk Insurance Act (TRIA) in November 2002 and the Terrorism Risk Insurance Extension Act (TRIEA) in 2005. Both pieces of legislation mandate the availability of terrorism coverage for selected commercial lines, while creating a federal backstop for terrorism-related insurance claims.

Since TRIEA's enactment, the federal legislature, the insurance industry and policyholders have been seeking an acceptable solution for the next phase—after TRIEA's expiration on January 1, 2008. That work is progressing in the form of H.R. 2761—the Terrorism Risk Insurance Revision and Extension Act of 2007 (TRIREA)—which has been passed by the House of Representatives. In parallel, the Senate Banking, Housing, and Urban Affairs Committee also passed new legislation. The Bush Administration has indicated its support of the Senate legislation.

The existing backstop covers losses from certified terrorism events irrespective of weapon type. However, in mandating the availability of coverage by the private insurance industry, TRIA and TRIEA deferred to pre-existing policy exclusions (other than for terrorism per se). While there are no allowable exclusions for workers' compensation, it was generally accepted that property insurers do exclude certain losses from nuclear, biological, chemical and radiological (NBCR) events. For example, property policies have a nuclear hazard clause that excludes losses from radioactive contamination, but would not exclude losses from fires resulting from a nuclear or radiological event.

According to intelligence reports, al-Qaeda and other terrorist groups are attempting to acquire NBCR weapons. The prospect of their success highlights the significant amounts of exposure in the U.S. that remain uncovered. To address the risk, H.R. 2761 would mandate availability of insurance coverage for NBCR events. This new provision would offer higher recoveries through lower company deductibles. Its implementation is to be delayed until 2009. The Senate version does not mandate this coverage, but requires a study of the issue, due one year after enactment.

For NBCR weapons, the principal cause of loss to the included property lines is contamination. Losses can stem from cleanup, or dismantling and rebuilding, depending on the standards for residual contamination and the relative costs involved. Making matters more complex, the standards for residual nuclear and radiological contamination are determined after the event occurs, and they are decided by local stakeholders. Thus the covered losses can vary significantly from one locale to another and will remain unknown until well after the event. This can greatly impact the time it takes for claims to develop.

This white paper looks at the potential losses from NBCR events, elaborates on the current development of the terrorism backstop and discusses the implications of covering radiation

contamination cleanup. It also provides an overview of the latest release of the AIR Terrorism Model and describes ongoing work at AIR to address possible changes in coverage necessitated by new legislation.

NBCR Loss Scenarios

The final details of the new backstop legislation are yet to be determined. But it is clear there is sentiment for insurance coverage of property losses due to contamination from NBCR weapons.

In previous analyses AIR undertook for the American Academy of Actuaries Terrorism Risk Insurance Subgroup, AIR calculated insured losses in modeled lines for several attack scenarios (Reference 1). Shown below are modeled losses from a major biological attack in each of the following cities:

New York City	\$778 billion
Washington, D.C.	197
San Francisco	171
Des Moines	42

The Academy noted that, should TRIEA expire, the potential insured loss from an event on the order of the New York City scenario above could exceed the total policyholders' surplus for the entire property and casualty insurance industry.

Current Status of Backstop Extension

The backstop currently in effect, TRIEA, was enacted at the last minute—just before the expiration of TRIA in December 2005. It extended the federal backstop through 2007 and increased private insurance exposure; the insurer deductible is 20% of the 2006 applicable premium. Above the deductible, the insurer co-pay is 15%. Additionally, the size of the industry loss qualifying an event for coverage was increased to \$100 million. Domestic terrorism events and group life insurance remain excluded.

Within both TRIEA and its predecessor is the mandatory availability provision that applicable insurers:

“shall make available property and casualty insurance coverage for insured losses that does not differ materially from the terms, amounts, and other coverage limitations applicable to losses arising from events other than acts of terrorism.”

Insurers have generally shown little appetite for NBCR risk. While there are no exclusions for workers' compensation losses, property insurers have assumed that losses from NBCR events could be excluded. The nuclear hazard exclusion and pollution exclusion that exist in many policies, and which are accounted for in the AIR model, significantly limit insurers' exposure to contamination losses. Indeed, the availability of insurance coverage for such contamination is scant.

In their report of September 2006, the Government Accountability Office acknowledged the magnitude of the potential losses provided in the AIR scenarios and the industry's understandable lack of appetite, concluding (Reference 2):

“Given the challenges faced by insurers in providing coverage for, and pricing NBCR risks, any purely market-driven expansion of coverage is highly unlikely in the foreseeable future.”

The President's Working Group on Financial Markets similarly acknowledged both the AIR results and the industry's reluctance (Reference 3):

“In contrast to the overall market for terrorism risk insurance, there has been little development in the terrorism risk insurance market for CNBR risks since September 11. Given that insurance companies have historically excluded coverage for these types of losses—even if not caused by terrorism—there may be little potential for future market development.”

In response, the House Financial Services Committee addressed NBCR risk head on in H.R. 2761 (Reference 4):

“...as nuclear, biological, chemical or radiological acts of terrorism (known as NBCR terrorism) present a threat of loss of life, injury, disease and property damage potentially unparalleled in scope and complexity by any prior event, natural or man-made, the Federal Government's responsibility in providing for and preserving national economic security calls for a strong Federal role in ensuring financial compensation and economic recovery in the event of such an attack.”

More specifically, H.R. 2761 adds to the mandatory availability provision:

“...[applicable insurers] shall make available, in insurance policies for covered lines for which the coverage described in subparagraph (A) is provided, exceptions to the pollution and nuclear hazard exclusions of such policies that render such exclusions inapplicable only as to insured losses arising from acts of NBCR terrorism.”

Under the legislation, the insurer's deductible for NBCR is to be significantly lower than the 20% deductible for conventional attack losses. The deductible for property and casualty insurers for NBCR losses will start at 3.5% of applicable premium and increase by 50 basis points each succeeding year. The insurer's co-share of losses above the insurer deductible will be reduced on a sliding scale as industry losses increase. Implementation of this provision, however, would be delayed until 2009.

Other changes included in H.R. 2761 include:

- a 15-year extension of the term for the legislation
- the inclusion of group life and farm owners' multiple-peril insurance lines
- inclusion of coverage for domestic terrorism events
- a post-event reset of the deductible after years with a significant industry loss
- a reduction of the qualifying event trigger to \$50 million.

H.R. 2761 was approved with amendments by the House Financial Services Committee on August 1. The Congressional Budget Office released an assessment of the cost of the bill, informed by the AIR analysis, on September 6. It estimates a ten-year cost of \$10.4 billion. Of course the cost will be zero if no large attacks occur, but it could be much higher under conditions of one or more very large attacks. The report caused difficulties due to pay-as-you-go rules. H.R. 2761 was amended to work around pay-as-you-go, and approved by the full House by a vote of 312 to 110 on September 19.

In 2005, the House considered many options and developed a number of modifications to TRIA. The Senate ultimately prevailed, however, advocating a short extension with limited changes. Since then, the majority party has changed in both chambers. On October 17, the Senate Committee on Banking, Housing, and Urban Affairs approved by 20 to 1 an extension called the Terrorism Risk Insurance Program Reauthorization Act of 2007. It is a markup of TRIEA, extending the program for seven years. It deletes the domestic terrorism exclusion, but retains the same lines of coverage, the “make available” provision, the program trigger, deductible, and federal share as the current year of TRIEA. It calls for studies of NBCR insurance and of terrorism insurance in specific markets. To help quantify the risk and inform the bill’s measures, AIR provided analysis to committee staff. The full Senate is expected to take up the legislation before the end of the current session.

Of course, the White House will ultimately weigh in and has the power to veto any Congressional agreement. The Office of Management and Budget, on September 17, released a Statement of Administration Policy, stating that the President’s senior advisors would recommend that he veto H.R. 2761 in its current form. The Bush administration has pronounced three objectives for any renewal of TRIEA:

- The program remains short-term and temporary
- The program should not be expanded
- The private sector should increase its retentions

None of the White House’s objectives are met by H.R. 2761. However, the Administration did express support for the Senate version, shortly before its consideration in the Banking Committee, if it is approved by Congress intact.

As of this writing, the program’s extension must be passed by the Senate and a compromise solution must be developed by the Senate with the House. While it appears that the mandatory availability of coverage for NBCR could be deferred for at least a year, it is prudent to understand the ramifications of such a provision now. The next sections of this paper provide a more detailed examination.

Implications of Mandatory NBCR Coverage

Eliminating exclusions for NBCR events has different implications for insurance losses depending on whether the attack is chemical/biological or whether it is nuclear/radiological.

Chemical and Biological Attacks

Chemical and biological exclusions have as their origin pollution exclusions that existed prior to TRIA. Those exclusions may or may not be in effect in a policy or for a specific writer. If they are, they may or may not have exceptions. Thus, the total covered loss from an attack could be a fraction of the total loss incurred by the policyholders.

Utilizing assumptions regarding the take-up of terrorism insurance coverage by policyholders, AIR calculated uninsured losses (which include excluded losses and losses that property owners opted not to insure) for the biological attack scenarios referenced above as follows:

New York City	\$168 billion
Washington, D.C.	34
San Francisco	42
Des Moines	11

These uncovered losses are in the property lines and represent a significant portion of the total losses.

Nuclear and Radiological Attacks

For nuclear and radiological attacks, excluded losses stem from the nuclear hazard exclusion. They eliminate coverage for losses from radiation or radioactive contamination and leave coverage solely for damages caused by fire. (In the AIR model, estimated property losses appropriately capture this distinction.) Injury models are different; they account for the effects of radiation exposure.

For an attack employing a “dirty bomb”, or radiological dispersion device (RDD)—radioactive material combined with conventional explosives—the covered property loss is solely due to the effects of the bomb, which is used as a dispersing mechanism. The bomb is typically a relatively small explosive device that causes physical damage within a limited area.

For a nuclear bomb, there are four predominant damage effects:

- blast and shock
- thermal radiation
- initial nuclear radiation
- residual nuclear radiation contamination, or fallout.

The blast component is represented by an enormous shockwave followed instantaneously by a rapid expansion of air. The Hiroshima bombing—estimated at 15 kilotons—destroyed wooden houses within a 1.4 mile radius. Tens of millions of degrees of thermal radiation—compared to a few thousand degrees in a conventional explosion—melted tile and glass and caused consumption of combustible materials within the blast’s perimeter.

The effects of blast and thermal radiation are near instantaneous and direct. In the AIR model, blast and thermal radiation are treated indistinguishably and are modeled as fire, and therefore



assumed to be covered under property policies. The radius of complete destruction due to fire is 0.5 to 3 miles for the modeled weapon sizes.

Initial nuclear radiation—the third predominant damage effect from a nuclear bomb—is characterized by highly penetrating and harmful gamma rays and neutrons. These particles impact a range similar to that affected by blast and thermal radiation and over a similar timeline.

The fourth predominant damage effect—residual radioactive contamination—is a different mechanism altogether. In a surface nuclear burst, earth, dust, and debris are taken up into the fireball and are contaminated. The diameter of these contaminated particles can range in size from 1 micron to several millimeters. Larger particles immediately fall back to earth, while the smallest particles may remain suspended in the atmosphere. They can even circle the earth several times before falling to the ground. In terrorism scenarios modeled by AIR, radioactive and nuclear contamination can cause losses across areas up to 1,600 square miles.

For property insurers, radioactive contamination from a terrorist's nuclear bomb or RDD represents an entirely new kind of exposure. Currently, it is excluded in the nuclear hazard exclusion as a result of the Price-Anderson Nuclear Industries Indemnity Act, first passed in 1957 and designed for nuclear incidents at nuclear power facilities.

Decontamination and Restoration

Cleanup of radioactive contamination is a daunting proposition, as illustrated by incidents at Three Mile Island and Chernobyl. When an area is decontaminated, all contaminated material is removed from the scene. This includes buildings in the immediate downwind fallout path of a nuclear bomb blast, which generally must be dismantled and properly disposed. As the distance from the detonation site increases, the contamination level decreases. At some distance, buildings will not have to be destroyed and removed, but their affected surfaces will still require decontamination, which can represent a more costly and challenging effort than rebuilding.

Damage from an RDD is clearly on a different (smaller) scale than damage from a nuclear bomb; the immediate radiation is not as intense, and it is also unlikely to cause immediate fatalities. The radius of contamination is measured in tens of blocks. However, the radioactive particles may still chemically bind to concrete and asphalt, or become lodged in the crevices of building exteriors, interiors, and streets and sidewalks, making decontamination difficult. Any and all affected surfaces will likely need to be removed. Affected areas could be unavailable to businesses and residents for several years, until cleanup is complete. Candidate decontamination methods include chemical treatment and sandblasting, but demolition and rebuilding may be the most cost-effective approach.

Decontamination Standards

Radioactive contamination spreads over substantial distances. The amount of residual radiation contamination decreases with distance, but the total area and number of properties needing cleanup increases substantially with distance. There is no single point at which there

is no more contamination; it just is less at longer distances. Furthermore, decontamination activities decrease the amount of contamination, but do not eliminate it. The critical question is: How much residual contamination is acceptable? The lower the acceptable residual contamination, the more area will need to be decontaminated and the more intense will be the decontamination effort.

Radiation dosage standards are well established in terms of the acceptable amount of exposure to radiation workers and to the general population. For example, the Nuclear Regulatory Commission (NRC) states that the limit for annual occupational dosage for adults working with radioactive material is 5 rem. The American Conference of Governmental Industrial Hygienists recommends an average annual dose for radiation workers of 2 rem averaged over 5 years.

For the general public, the NRC requires its licensees to limit maximum radiation exposure to 100 mrem per year above the normal background level of radiation exposure, which is assumed to be 360 mrem per year (a full set of dental X-rays equates to about 40 mrem). This is consistent with the recommendations of national and international scientific organizations such as the International Commission on Radiological Protection.

Decontamination standards in use for radioactivity were developed originally to handle accidental releases and to affect cleanup of hazardous sites—they were not developed for intentional contamination caused by terrorists in cities. For example, the NRC specifies a level of 25 mrem per year for the cleanup after license termination. An even tougher standard—15 mrem per year—is established by the Environmental Protection Agency for sites with radioactive contamination under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

How do cleanup standards affect an insurer's exposure to radiological contamination? In a paper from the Pacific Northwest National Laboratory (Reference 5), the area requiring cleanup after a 0.7 kiloton nuclear bomb increases from 179 square kilometers to 1,430 square kilometers when the cleanup standard is changed from to 100 mrem per year to 15 mrem per year. Thus, there is an 8-fold increase in area (and resulting cost) between a 100 mrem per year and a 15 mrem per year cleanup standard.

The status of cleanup standards as they might apply after a terrorist attack is now the domain of the Department of Homeland Security (DHS). DHS recognized the need for federal guidance in this area after the TOPOFF 2 simulation exercises of 2003, which revealed that the existing standards for cleanup were the EPA guidance for nuclear plant spills, dating from 1992. The EPA document was subsequently updated and titled "Preparedness Directorate; Protection Action Guides [PAG] for Radiological Dispersion Device (RDD) and Improvised Nuclear Device (IND) Incidents." (Reference 6) A multi-agency working group that included the EPA developed the draft. It was published in the Federal Register on January 3, 2006. The draft PAG provides interim guidance effective on that date.

The draft PAG addresses three stages of the cleanup with the intent of providing federal guidance to those affected. The first two phases, early and intermediate, deal with sheltering

and evacuation of the public and with protecting emergency workers. For example, the general public should be relocated if the total dosage exceeds 2 rem per year in the first year or 500 mrem per year in any succeeding year.

For late phase, which is the cleanup phase, there is no prescribed standard. Instead, an optimization process is prescribed for reaching a consensus well after the attack.

“Because of the extremely broad range of potential impacts that may occur from RDDs and INDs (e.g., ranging from light contamination of one building to widespread destruction of a major metropolitan area), a pre-established numeric guideline is not recommended as best serving the needs of decision makers in the late phase. Rather, a process should be used to determine the societal objectives for expected land uses and the options and approaches available, in order to select the most acceptable criteria.”

Various agencies and organizations have commented on the interim PAG. The Department of Energy indicated that they support the concept of optimization for late phase PAGs, but recommended that consideration be given to discussing some bounding values for the cleanup phase. The Health Physics Society (Specialists in Radiation Safety) position statement recommends that continued cleanup during the late phase be subject to the principles of ALARA (as low as reasonably achievable)—which seeks to minimize the risk of radioactive exposure while keeping in mind that some exposure may be necessary and therefore acceptable in order to further the clean-up effort. The Health Physics Society position statement recommends that economic and social factors be taken into account, with a minimum level of continued cleanup per year of 100 mrem, the general population exposure limit standard.

Additional government workshops have been held in 2007. A revised PAG Manual is expected to be published in the Federal Register for public comment later this year. Assuming that the optimization process remains the standard for radiation cleanup, insurers contemplating mandated availability of property coverage for radiation contamination face considerable uncertainty. Should the key stakeholders decide to implement the stringent EPA standard, the ground-up event cost could be eight times greater than the standard defined for general population exposure. The applicable standard will not be defined until the event has occurred, however. Naturally, the property policyholders—needing to persuade the public to reoccupy their contaminated facilities—will be compelled to seek the more stringent standards.

AIR Terrorism Model Updates

AIR continues to study the impact of proposed changes to TRIEA and monitor developments that might possibly impact insurer exposure. AIR is currently developing modeled property loss costs to reflect the mandatory NBCR offering. The ground-up losses could be substantial. The insurer exposure will depend to a large extent on the level of the backstop provided by the federal government. Reduced insurer deductibles and co-shares will serve to limit insurer exposure.

AIR is releasing an update to the terrorism model later this month. Of course, model changes reflecting draft legislation would be premature. Rather, this update incorporates two years of research on the effects of urban environment characteristics on conventional bomb blast damage. Bomb blast damage is affected by the reflections of pressure waves interacting with nearby buildings. Damage, in an open environment, is caused by the pressure wave emanating directly from the blast. With other buildings in the immediate area, the pressure wave will reflect from those buildings and reinforce the damage in the local area at the expense of reducing damages at further distances. AIR has created conventional bomb blast damage functions tuned to the local environment for all locations in the United States, and incorporated them in the new release.

Also in this release, AIR has updated the injury severity functions that model injuries and fatalities resulting from bomb blast events. These functions are used in workers' compensation, life, and disability loss modeling. The injury functions incorporate the latest research from the medical community regarding trauma from terrorist bomb blasts. AIR has also updated the default state level workers' compensation injury benefit costs for each state, an annual update based on NCCI claims data.

Conclusion

In conclusion, developments continue to increase the exposure to terrorism faced by insurers. In this discussion, we have focused on the increased exposure that could result from legislation to extend TRIEA. This could include higher participation in losses and increased exposure to costly contamination. As detailed in a previous white paper available on the AIR website at http://www.air-worldwide.com/_public/html/terrorism_risk_whitepaper.asp, diligent insurers are urged to manage their risk through diversification and quantification using AIR's recommended best practices:

- Measure and limit exposure concentrations, particularly in and around identified landmark targets
- Analyze loss scenarios for defined terrorist attack events at exposure concentrations and at landmark targets
- Utilize the AIR probabilistic terrorism loss model to understand exceedance probabilities and large loss scenarios across lines of business.

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About AIR Worldwide Corporation

AIR Worldwide Corporation (AIR) is the scientific leader and most respected provider of risk modeling software and consulting services. AIR founded the catastrophe modeling industry in 1987 and today models the risk from natural catastrophes and terrorism in more than 50 countries. More than 400 insurance, reinsurance, financial, corporate and government clients rely on AIR software and services for catastrophe risk management, insurance-linked securities, site-specific seismic engineering analysis, and property replacement cost valuation. AIR is a member of the ISO family of companies and is headquartered in Boston with additional offices in North America, Europe and Asia. For more information, please visit www.air-worldwide.com.