



# Circular

MAY 29, 2008

ANNOUNCEMENT

TN-2008-04

## Tennessee—Item 01-TN-2008—Catastrophe Provisions Miscellaneous Values, Rules, Statistical Codes and Forms

**ACTION  
NEEDED**

Please review the changes outlined in the attachments to this circular for impact on your company's systems and procedures. Also review the *Status of Item Filings* circular for state approval of this item.

**Caution:** At the time of distribution of this circular, this item has been filed with the regulator but is **not yet approved**. This information is provided for your convenience and analysis. Please do not use the information until the regulators have approved the filing.

**BACKGROUND**

NCCI has submitted Item 01-TN-2008—Catastrophe Provisions Miscellaneous Values, Rules, Statistical Codes and Forms to the Tennessee Department of Commerce and Insurance. Item 01-TN-2008 proposes to eliminate the distinction between foreign and domestic terrorism by:

- Producing separate miscellaneous values by state to address losses resulting from “Terrorism” and “Catastrophe (other than Certified Acts of Terrorism)”
- Replacing the references of “foreign terrorism” and “domestic terrorism, earthquakes, and catastrophic industrial accidents (DTEC)” in NCCI manuals with the terms “terrorism” and “catastrophe (other than certified acts of terrorism)”
- Providing new descriptions for Statistical Codes 9740 and 9741
- Withdrawing the Terrorism Risk Insurance Program Reauthorization Act Endorsement (WC 00 01 13 A) and including this information on the current Foreign Terrorism Premium Endorsement (WC 00 04 22), which will become the Terrorism Risk Insurance Program Reauthorization Act Disclosure Endorsement (WC 00 04 22 A)
- Updating the Domestic Terrorism, Earthquakes, and Catastrophic Industrial Accidents Premium Endorsement (WC 00 04 21 B) to reflect the term “Catastrophe (other than Certified Acts of Terrorism)”, which will become the Catastrophe (other than Certified Acts of Terrorism) Premium Endorsement (WC 00 04 21 C)
- Updating the Foreign Terrorism Premium Endorsement (WC 00 04 22) to include disclosure requirement language and reflect the term “terrorism,” which will now contemplate foreign terrorism as well as domestic terrorism

**IMPACT**

The estimated impacts in each state are shown in Exhibits 6 and 11.

**NCCI ACTION**

NCCI will release updated pages of NCCI's *Basic Manual for Workers Compensation and Employers Liability Insurance*, *URE Workers Compensation Statistical Plan*, *Statistical Plan for Workers Compensation and Employers Liability Insurance*, and *Forms Manual of Workers Compensation and Employers Liability Insurance* upon approval.

**PERSON TO  
CONTACT**

If you have any questions, please contact:  
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FILING MEMORANDUM

**ITEM 01-TN-2008—CATASTROPHE PROVISIONS MISCELLANEOUS VALUES, RULES,  
STATISTICAL CODES AND FORMS**

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**(To be effective 12:01 a.m. on September 1, 2008, applicable to new and renewal voluntary policies only.)**

**PURPOSE**

As a result of the recent passage of the Terrorism Risk Insurance Program Reauthorization Act of 2007 (“TRIPRA”) by the United States Congress (Congress), this item eliminates the distinction between foreign and domestic terrorism by:

- Producing separate miscellaneous values by state to address losses resulting from “Terrorism” and “Catastrophe (other than Certified Acts of Terrorism)”
- Replacing the references of “foreign terrorism” and “domestic terrorism, earthquakes, and catastrophic industrial accidents (DTEC)” in NCCI manuals with the terms “terrorism” and “catastrophe (other than certified acts of terrorism)”
- Providing new descriptions for Statistical Codes 9740 and 9741
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- Updating the Domestic Terrorism, Earthquakes, and Catastrophic Industrial Accidents Premium Endorsement (WC 00 04 21 B) to reflect the term “catastrophe (other than certified acts of terrorism)”, which will become the Catastrophe (other than Certified Acts of Terrorism) Premium Endorsement (WC 00 04 21 C)
- Updating the Foreign Terrorism Premium Endorsement (WC 00 04 22) to include disclosure requirement language and reflect the term “terrorism”, which will now contemplate foreign terrorism as well as domestic terrorism

**BACKGROUND**

In response to the Terrorism Risk Insurance Act of 2002 (“TRIA” or the “Act”) and the Terrorism Risk Insurance Extension Act of 2005 (“TRIEA”), NCCI filed Items B-1383, B-1393, B-1398, P-1392, and P-1404, which implemented the Terrorism Risk Insurance Act of 2002, and then provided miscellaneous values for foreign terrorism. As a result of the passage of TRIA , NCCI filed catastrophe provisions for certified foreign terrorism losses in all NCCI states at the end of 2002. These catastrophe provisions were filed so that NCCI could exclude foreign terrorism losses from ratemaking.

In addition to terrorism, earthquakes and catastrophic industrial accidents can result in losses of extraordinary magnitude for workers compensation. While the exposure is real, the absence of a large event in recent history means that the current loss costs and rates do not account for it. For this reason, NCCI filed catastrophe provisions for domestic terrorism, earthquakes, and catastrophic industrial accidents (“DTEC”) in 2004. As with foreign terrorism, NCCI would be excluding all DTEC losses resulting from these major catastrophes from ratemaking. The threshold for each of these exposures is \$50 million. This means that

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the modeling results assumed that all events exceeding \$50 million of loss for workers compensation would be removed from ratemaking.

On December 26, 2007, Congress enacted the Terrorism Risk Insurance Program Reauthorization Act of 2007 ("TRIPRA"), which amends the definition of "act of terrorism" to include domestic terrorism. Due to the short time frame for compliance, NCCI filed Item 02-TN-2007 in response to TRIPRA, to update the rule reference and disclosure requirements in the TRIA Disclosure Endorsement and the Domestic Terrorism, Earthquakes, and Catastrophic Industrial Accidents Premium Endorsement.

This item proposes that the terrorism miscellaneous value include both domestic and foreign terrorism. This will enable carriers to use one TRIA premium as opposed to separate premiums for foreign and domestic terrorism.

Therefore, this item removes domestic terrorism from the DTEC miscellaneous value and includes them in the terrorism miscellaneous value (formerly the Foreign Terrorism miscellaneous value). Additionally, rule references to these catastrophe provisions will be changed, forms will be updated and statistical codes will be relabeled accordingly.

For purposes of this item, the following definitions apply:

- **Catastrophe (other than Certified Acts of Terrorism):** Any single event, resulting from an Earthquake, Non-certified Act of Terrorism, or Catastrophic Industrial Accident, which results in aggregate workers compensation losses in excess of \$50 million.
- **Earthquake:** The shaking and vibration at the surface of the earth resulting from underground movement along a fault plane or from volcanic activity
- **Non-certified Act of Terrorism:** An event that is not certified as an Act of Terrorism by the Secretary of Treasury pursuant to the Terrorism Risk Insurance Act of 2002 (as amended), but that meets all of the following criteria:
  - a. is an act that is violent or dangerous to human life, property or infrastructure;
  - b. the act results in damage within the United States, or outside of the United States in the case of the premises of United States missions or air carriers or vessels as those terms are defined in the Terrorism Risk Insurance Act of 2002 (as amended) ; and
  - c. an act that has been committed by an individual or individuals as part of an effort to coerce the civilian population of the United States or to influence the policy or affect the conduct of the United States Government by coercion.
- **Catastrophic Industrial Accident:** A chemical release, large explosion, or small blast that is localized in nature and affects workers in a small perimeter the size of a building.

**Catastrophe Modeling**

Since there is a lack of historical data to support catastrophic loss estimates, NCCI has relied on catastrophe modeling for evaluating and estimating the risk associated with these exposures. In order to complete the modeling, NCCI contracted with EQECAT. Serving the global property and casualty industry, EQECAT is

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known as a technical leader and innovator in the development of analysis tools and methodologies to quantify insured exposure to natural and man-made catastrophic risk.

For this filing, EQECAT developed three models for NCCI. These three models address the potential exposure to workers compensation for terrorism, earthquakes, and catastrophic industrial accidents. The models are described in detail in the Appendix.

**Terrorism**

Exhibit 3 shows the selected terrorism loss costs excluding LAE for states modeled by EQECAT. The modeling exercise produces a range of loss costs per employee for the modeled states shown in Columns (2) and (3). The loss costs exclude loss adjustment expense. The indicated loss costs per employee for modeled states are based on the modeling approach described in the Appendix assuming a frequency of one terrorist event per year as the default. The results are scalable, based on a different frequency assumption. A range of .25 to 3 terrorism events per year countrywide was used, based on input from EQECAT.

Two adjustments are necessary to convert this information to a loss cost per \$100 of payroll. First, an adjustment is made to recognize the impact of TRIPRA. This adjustment recognizes that individual company exposure to a certified event is limited. Depending on the state, NCCI's analysis has led to an indicated adjustment factor of 45% to 95% for this component. This adjustment factor is shown in Column (4). The analysis is based on the provisions of the Act, which allow for a recovery of 85% of the insurer's losses above an individual company retention of 20% of the prior year's direct earned premium for that company. The program trigger is \$100 million and there is an annual program cap of \$100 billion in combined federal and industry-shared insured losses. For modeled states, NCCI looked at individual state loss distributions for terrorism and assessed the impact of the Act on a variety of attachment point and aggregate loss combinations. States whose aggregate expected losses are higher will expect a larger reduction in gross loss due to the Act. The second adjustment uses the state average weekly wage (Column (5)) to adjust the loss costs from a per-employee basis to a per-\$100 of payroll basis. The range of indicated loss costs are shown in Columns (6) and (7). Column (8) shows the selected loss costs for the modeled states.

Exhibit 4 shows the selected terrorism loss costs including LAE by state. NCCI uses a proxy state approach to apply the terrorism provisions to the remaining nonmodeled NCCI states.

The table of proxy states is shown below:

Modeled States	Proxy States
Arizona	Colorado, Idaho, Louisiana, Montana, Nevada, Oregon, Rhode Island, Utah
Illinois	Maryland, Virginia
Iowa	Alabama, Alaska, Arkansas, Connecticut, Hawaii, Kansas, Kentucky, Maine, Mississippi, Missouri, Nebraska, New Hampshire, New Mexico, Oklahoma, South Carolina, South Dakota, Tennessee, Vermont, West Virginia

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District of Columbia, Florida, Georgia, Indiana	None
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Loss-based expenses by state are shown in Column (4). The final terrorism loss costs including LAE by state are shown in Column (5).

Exhibit 5 shows the final voluntary rates and assigned risk rates by state. Where applicable, the terrorism loss costs excluding loss adjustment expense by state have been divided by the permissible loss ratio (PLR) in order to reflect expenses, including loss adjustment expense.

Exhibit 6 shows the estimated impact of the proposed changes in terrorism provisions by state on both a percentage and a dollar amount basis.

**Catastrophe (other than Certified Acts of Terrorism)**

*Catastrophic Industrial Accidents*—EQECAT developed a model to quantify the potential exposure to catastrophic industrial accidents. These are accidents that would produce workers compensation losses in excess of \$50 million. A detailed description of the model is contained in the Appendix. The modeling was performed for Florida, Illinois, Kansas, Kentucky, Louisiana, and North Carolina.

Based on the modeling results, an industrial accident loss cost of .005 was selected in each state, excluding loss adjustment expense. This information is shown in Exhibit 7.

*Earthquake*—EQECAT produced an earthquake model for each state with significant earthquake exposure. In addition, because of its unique nature, a tsunami model was also included for Alaska. The modeling was performed for Alaska, Arkansas, Hawaii, Missouri, Nevada, Oregon, South Carolina, Tennessee, and Utah. The indicated earthquake loss costs excluding loss adjustment expense are shown in Exhibit 8.

*Catastrophe (other than Certified Acts of Terrorism) Loss Costs by State Including Loss Adjustment Expense*

- Exhibit 9 shows the total catastrophe (other than certified acts of terrorism) loss cost by state including loss adjustment expense in Column (5). The loss-based expense factor shown in Column (4) is multiplied by sum of Columns (1) and (2) to include loss adjustment expense and other loss-based expenses by state.
- Exhibit 10 shows the final voluntary rates and assigned risk rates by state. Where applicable, the catastrophe (other than certified acts of terrorism) loss costs excluding loss adjustment expense by state have been divided by the permissible loss ratio (PLR) in order to reflect expenses, including loss adjustment expense.
- Exhibit 11 shows the estimated impact of the proposed catastrophe (other than certified acts of terrorism) provisions by state on both a percentage and a dollar amount basis.

**Carrier Use of Loss Cost Information**

- Exhibits 12 and 13 propose changes to NCCI's **Basic Manual** miscellaneous values pages
- Exhibits 14 and 15 propose changes to NCCI's **Basic Manual** rules

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- Exhibits 16-A, 16-B, 17, 18-A, and 18-B propose changes to the existing statistical reporting codes to be used for reporting these charges
- Exhibits 19, 20, and 21 propose updates to NCCI's *Forms Manual*

**PROPOSAL**

It is proposed that the following items be adopted:

- Separate miscellaneous values to address losses resulting from "Terrorism" and "Catastrophe (other than Certified Acts of Terrorism)"
- References of "foreign terrorism" and "domestic terrorism, earthquakes, and catastrophic industrial accidents (DTEC)" in NCCI manuals replaced with the terms "terrorism" and "catastrophe (other than certified acts of terrorism)"
- Statistical Codes 9740 and 9741 relabeled
- The Terrorism Risk Insurance Program Reauthorization Act Endorsement (WC 00 01 13 A) withdrawn and this information included on the updated Foreign Terrorism Premium Endorsement (WC 00 04 22)
- The Domestic Terrorism, Earthquakes, and Catastrophic Industrial Accidents Premium Endorsement (WC 00 04 21 B) updated to reflect the term "catastrophe (other than certified acts of terrorism)"
- The Foreign Terrorism Premium Endorsement (WC 00 04 22) updated to include disclosure requirement language and reflect the term "terrorism", which will now contemplate foreign as well as domestic terrorism

**IMPACT**

The estimated impacts in each state are shown in Exhibits 6 and 11.

**IMPLEMENTATION**

The attached exhibits, listed in the Table of Contents, include the proposed changes necessary to implement this item. This item will be implemented effective 12:01 a.m. on September 1, 2008, applicable to new and renewal voluntary policies only.

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**ITEM 01-TN-2008—CATASTROPHE PROVISIONS MISCELLANEOUS VALUES, RULES,  
STATISTICAL CODES AND FORMS****APPENDIX****DESCRIPTION OF EQECAT CATASTROPHE MODELS****INTRODUCTION**

In the past, separate EQECAT models were developed to provide estimates of the risks to workers compensation insurers due to the following perils:

- Terrorism events
- Industrial accidents
- Earthquake ground shaking

These models are described below. For purposes of this filing, only the Terrorism model has been updated.

**TERRORISM****1. Exposure**

The location, number, and types of employees are needed to characterize the risk exposures to terrorism events. Business information and Bureau of Labor Statistics databases were used to obtain the addresses of businesses and the estimated number of employees assigned to each location. With more than 100 million workers nationwide at over 10 million businesses, it was necessary to aggregate the exposure. For this model, the exposure was aggregated to the census block level (typically a city block). This aggregation level was suitable for the terrorist events that span hundreds of meters.

The number of workers in each block was prorated to approximately account for part-time workers, workers absent for various reasons, and the self-employed. The workers in each census block were grouped into five NCCI industry groupings: Goods & Services, Office & Clerical, Manufacturing, Construction, and All Others. Certain government classifications not covered by workers compensation were excluded.

**2. Weapons Selection**

Specific weapons were selected from the range of known or hypothesized terrorist weapons. The selection process considered weapons that have been previously employed, weapons that could cause large numbers of casualties, or weapons that would be more readily available. In some cases, a "likely" or "practical" weapons size (or quantity of agent) was selected; in other cases, a range of weapons sizes was selected, in part, to reflect standard quantities that might be available. The selected weapons and their sizes are described below.

**Blast/Explosion**

- Conventional explosives—400 lb / 4,000 lb / 12,000 lb TNT
- Nuclear bomb—1 kiloton and 10 kiloton
- Aircraft impact—large passenger airline

**Chemical**

- Chlorine—15-ton truck, 90 ton railcar
- Anhydrous ammonia—15-ton truck, 90-ton railcar
- Hydrogen cyanide—50 gallons
- Sarin—1 gallon
- Mustard gas—50 gallons

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**Biological**

- Anthrax—1 oz inside building, 1 oz outside building, 10 oz mobile dispersion
- Botulism Toxin—1 oz inside building

**Radiological**

- Nuclear power plant radioactive release due to sabotage—10% of core radioactivity
- Dirty bomb—10,000 curies

The effects of each type of weapon will vary with the size of the weapon, with atmospheric conditions, and in some cases with local terrain. If detailed knowledge is available, a correspondingly detailed simulation of the effects is possible but would be time-consuming to perform. In a large-scale nationwide analysis with millions of simulated events, where local atmospheric and terrain are only generally known, a simpler more generalized simulation is necessary. The simplifications necessary to efficiently model footprints of weapons effects are described below.

For conventional blast loading, blast simulation software is used to estimate casualties in various urban settings where the geometry and height of the buildings is varied. The results of these detailed simulations are used to develop simplified blast attenuation functions that vary with distance and with the general terrain. For conventional blast loading, the footprint is defined as a decreasing function of distance from the source of the blast.

The casualties for nuclear blast can be estimated on the basis of empirical data resulting from wartime and nuclear test experience. Casualties are assumed to be a function of distance from ground zero with the source located either at ground level or at a relatively low altitude. A simplified, conservative casualty footprint was created to encompass the range of conditions that could exist. Long-term radiation effects are not considered.

The casualty effects for aircraft impact are very much dependent upon the details of the event, so much so that only a simple, conservative footprint can be employed. A simplifying assumption is made that the extent of the footprint is a function of the height of the building.

For chemical, biological, and radiological agent releases, a plume is formed that is influenced by atmospheric conditions and by the terrain. The footprint of the cumulative dose that is deposited by a plume over time was calculated using the simulation software, MIDAS-AT (Meteorological Information and Dispersion Assessment System—Anti-Terrorism™). Terrain conditions were assumed to be “rough” to conservatively approximate a general urban terrain, and the wind direction was assumed to be unchanging. The plume footprint was calculated for low, medium, and high wind speeds and for three different atmospheric turbulence conditions. Any of the footprints could then be oriented in each of eight compass directions. Most of the footprints were truncated after an elapsed time of about two hours to account for successful evacuation.

**3. Targets**

A target is the location of a terrorist attack and, in the model, represents the locus of a casualty footprint. An inventory of targets is created by selecting locations with the following characteristics:

- Tall buildings—10 stories and higher
- Government buildings—with large number of employees or of a critical or sensitive nature (e.g., FBI office)
- Airports—major
- Ports—major

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- Military bases—US armed forces
- Prominent locations—capitol buildings, major amusement parks, etc.
- Nuclear power plants—operational
- Railroads, railroad yards and stations—freight lines for railroad cars carrying chemicals
- Chemical facilities—emphasizes those with chlorine and ammonia on site

Nuclear power plants and chemical facilities receive only specific casualty footprints. Other locations are assigned more than one type of terrorist weapon.

Some footprints have no specific target but are distributed at regular intervals throughout the urban area. This spreads out the effect to a larger population in the urban area.

Mobile release anthrax is not located at any target but located in the general downtown area in major metropolitan areas.

**4. Frequency of Attack**

The relative likelihood of a type of attack occurring at a target location is represented by an assigned (annual) frequency. The significance of an attack's frequency is in its relationship to other attacks. Attack frequency is based on the following considerations:

- Availability of weapon
- Attractiveness of target
- Relative attractiveness of the region to other regions based on various theories

For footprints that are atmospheric releases of chemical, biological, and radiological agents, wind direction affects the assigned frequency. The frequency for each wind direction is weighted by the likelihood of the wind blowing in that direction based on historical wind speed and direction measurements for the region.

Nationwide results assume that there is, on average, one terrorist event per year. If a higher or lower degree of threat is perceived, results can be scaled assuming that all areas scale proportionately with the change in frequency.

**5. Analysis Methodology**

The analysis methodology applies a casualty footprint to an assigned target and then calculates the extent of casualties to the covered workers within the footprint. For chemical, biological, and radiological footprints, the dose to each employee is calculated, and a conversion is made to the degree or category of injury. Degree of injury is then converted to loss based upon the average costs by injury category provided by NCCI. The average costs provided vary by state.

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### INDUSTRIAL ACCIDENTS

Industrial accidents are characterized by the following elements:

- Facilities where industrial accidents occur
- Accident types
- Frequencies of accidents

### Facilities

Facilities capable of large industrial accidents resulting in casualties above a threshold were identified from several public and commercial data sources. The facilities considered as potential sources for large industrial accidents are identified below:

- Refineries
- Chemical plants (oil, gas, petrochemical, etc.)
- Water utilities
- Power utilities
- Other manufacturing plants

### Accident Types

Depending on the peril, the atmospheric conditions, the plant configuration and location, etc., the footprint of an accident could reach beyond the plant boundaries and affect workers in adjacent facilities and beyond. The perils considered in the study were broadly classified into three categories: chemical releases, large explosions, and all other accidents.

- **Chemical Releases:** Chemicals considered included chlorine, anhydrous ammonia, and other nonspecific chemicals. A range of potential atmospheric releases of chemicals was considered in the analysis. The range encompassed an upper quantity represented by the total amount of chemical stored on site and, in some cases, identified in the facility's Risk Management Program submittal as the worst-case scenario, and a lower release quantity representing the minimum release quantity that could produce consequences to meet the threshold definition of large industrial accidents. A continuous range of release quantities was considered within the range. All of the scenarios considered were modeled probabilistically and included the likelihood of the releases and their consequences as described above.
- **Large Explosions:** Explosion simulation software is used to estimate blast pressures and consequences of the explosion in terms of casualties. These footprints were varied probabilistically to simulate the variability in the effects of an explosion. The size of explosions varied by facility. The largest explosions were modeled to occur at oil refineries, where a significant potential for explosions exists.
- **All Other Accidents:** In addition to the above accident types, a smaller event was considered at all modeled facilities to simulate all other industrial accidents such as fires, explosions, confined space accidents, structure and component collapse, and all other random accidents that meet the threshold damage criteria of large industrial accidents.

### Frequencies of Accidents

The frequencies of occurrence of large industrial accidents in each of the modeled states were derived based on historical fatality and injury data available from BLS, OSHA and other sources. Frequencies of extreme events, which are very large and very rare, were based on ABS Consulting expert opinion. The consequences of such events were benchmarked to the Bhopal-type event.

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The relative likelihood of the three categories of perils simulated in the analysis was derived from historical data and varies by state.

**SEISMIC HAZARD (EARTHQUAKE)****Regional Hazard**

The calculation of annualized losses requires a probabilistic representation of the location, frequency, and anticipated ground shaking of all earthquakes that can be expected to occur in the region. The characterization of the location and frequency of earthquakes comprise what is commonly known as a seismotectonic model. One component of the seismic hazard model is the source zonation. Source zonation entails identifying potential seismogenic sources that can affect the site. These sources can either be faults or diffuse zones of seismic activity, commonly referred to as area sources and background seismicity. Each source zone represents a fault or area in which earthquakes are expected to be uniformly distributed with respect to location and size. Background seismicity is distinguished from an area source by the way that earthquake locations are treated. Earthquakes associated with background seismicity are allowed to have recurrence frequencies that smoothly vary over a region. Both area sources and background seismicity can include large earthquakes and are intended to model areas containing hidden or unknown faults or known faults, which are too numerous to be modeled individually. Earthquake source zones are identified from information on the geology, tectonics, and historical seismicity of the region.

The seismic hazard model also integrates the recurrence frequency of earthquakes. For each of the earthquake source zones, an earthquake recurrence relationship is developed. For area sources and background seismicity, this relationship is developed using an appropriate earthquake catalog, which is a listing of historically recorded or documented earthquakes. The catalog is analyzed for completeness by determining the time period over which all earthquakes of a given magnitude are believed to have been reported. Magnitudes are converted to a consistent magnitude measure (e.g., moment magnitude,  $M_w$ ) for use with the strong-shaking attenuation relationships (described in the next section) and for the determination of earthquake recurrence relationships.

Faults are modeled by either a characteristic earthquake model or a Gutenberg-Richter recurrence relationship, or both, depending on the available geologic information. The characteristic earthquake model assumes that earthquakes of about the same magnitude occur at quasi-periodic intervals on the fault. Using both a characteristic earthquake and a Gutenberg-Richter model is similar to the characteristic earthquake recurrence relationship proposed by Youngs and Coppersmith (1985), which predicts relatively more frequent large magnitude earthquakes than does the Gutenberg-Richter relationship by itself. The characteristic recurrence relationship is consistent with paleoseismic and historical earthquake data on individual faults (e.g., Coppersmith, 1991). For most faults, the recurrence relationships are constrained to be consistent with known geologic deformation along the fault, since there are usually very few historical earthquakes from which to develop a reliable earthquake recurrence relationship.

The maximum magnitude for each earthquake source zone is estimated from the published literature, from comparisons with similar tectonic regimes, from historical seismicity, and from the dimensions of mapped faults. The seismic hazard model simulates approximately 2,000,000 stochastic events across the US.

**Site Hazard Severity**

Attenuation relationships are used to predict the expected amplitude of ground shaking at a site of interest knowing an earthquake's magnitude and the distance from the fault to the site. Ground shaking is characterized by one or more ground-shaking parameters, the most notable of which are peak ground acceleration (PGA), response-spectral acceleration ( $S_a$ ), and Modified Mercalli intensity (MMI). These predictions are made for a uniform soil condition. Attenuation relationships are chosen to correspond as closely as possible to the tectonic environment of the region, since regional differences in earthquake source characteristics, crustal propagation properties, and site-response characteristics are known to have a significant effect on the observed ground shaking. Soil amplification factors are used to modify the ground-shaking parameter calculated for a uniform soil condition for the specific soil conditions at the site of interest.

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These factors are different for each ground shaking parameter. They are defined in terms of one or more site categories (or classes), each representing a specific set of site-response characteristics. Soil categories are defined in terms of simple qualitative or quantitative site descriptions, such as surface geology and shear-wave velocity (the speed at which seismic waves travel through the soil deposit, a measure of the strength of the deposit).

The effect of local soil conditions within each individual zip code was taken into account. In general, soft soil sites will experience higher earthquake motions than firm soil or rock sites for comparable locations relative to the earthquake fault rupture zone, thereby increasing the likelihood of damage to buildings on soft soil for a given earthquake.

**CASUALTY VULNERABILITY**

Casualty vulnerability establishes the casualty levels to various peril event magnitudes. While the casualty vulnerability for terrorism events and industrial accidents are similar, the casualty vulnerability for earthquakes is established differently.

**Industrial Accidents**

As discussed earlier in Section 3.2, three accident types were considered in the Industrial Accidents study: chemical releases, large explosions, and all other accidents. The latter category includes a variety of accidents that are localized in nature and affect workers in a small perimeter, the size of a building. These smaller scale accidents were simulated as small blasts. The methodology used to model chemical releases and blasts is as in the terrorism model described above.

**Earthquakes**

Workers' casualties due to earthquakes are directly correlated to the damage extent incurred by the buildings in which they work. Therefore, casualties due to earthquakes are estimated in two sequential stages:

- Estimation of building damage
- Estimation of worker's casualties based on the building damage

**Building Damage at the Workplaces**

Individual building vulnerability functions, that is, the probability of building damage given a level of ground shaking at the site, depends of the structure type, the age of construction, and the building height.

Vulnerability functions account for variability by assigning a probability distribution bounded by 0% and 100% with a prescribed mean value and standard deviation. The vulnerability functions were based on historical damage data and insurance claims data—including the analysis of over 50,000 claims from the Northridge and other earthquakes.

The probability distributions of ground shaking at the site and vulnerability functions are combined to estimate the probability of building damage for each earthquake event. The probability of damage at the site level is also combined probabilistically, accounting for correlation in ground shaking between zip codes and in damage level between the same and different structure types within and between zip codes.

Note that considerable randomness exists in earthquake damage patterns where randomness denotes the irreducible variability associated with the earthquake event. Randomness as characterized by the following parameters:

- Ground shaking
- Damage to the average structure of a given class at a given level of ground shaking
- Each structure's seismic vulnerability relative to the average structure of its class

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Modeling uncertainty, the lack of knowledge in characterizing each element of the model, is statistically combined with randomness and correlation to estimate overall variability in damage and loss to the entire portfolio.

### Casualties Due to Building Damage

Workers' casualty data resulting from earthquakes is very scarce in the United States. EQECAT is constantly using data from the most recent earthquakes worldwide to update its casualty functions, which correlate building damage to casualties. Because of differences in building design codes and construction practices, data from earthquakes outside the United States is adapted to local US conditions. This adaptation takes into consideration building damage state and its resulting casualties. To illustrate this concept, let us assume that a reinforced concrete building in Country X sustains 50% damage and causes injuries to 15% of its occupants. We assume that a similar reinforced concrete building, for example in California, sustaining the same damage level will cause a similar level of casualties. However, because of differences in building design and construction practices between California and Country X, the 50% damage could be caused by an earthquake acceleration of 0.3g in Country X, and twice that acceleration in California. In this example, higher seismic design provisions and practices are assumed applicable in California. The casualty rate functions used were developed using the most recent earthquake casualty data from Japan, Turkey, and Taiwan. EQECAT's proprietary workers compensation casualty rate functions are defined for four injury types: death, severe/major, minor/light, and medical.

### Losses Due to Casualties

Loss rates by injury type were provided by NCCI and used in calculating losses due to workers' casualties. The same loss rates were applied to all three perils. As described in Section 2, earthquake exposures were defined for different work shifts. The number of casualties by work shift for each work site and earthquake event is estimated prior to the application of the loss rates.

### Losses Due to Tsunami

Although all coastal states on the West Coast are prone to tsunamis, only Alaska was analyzed for this peril. Alaska has a higher worker rate near the shore in inundable zones and its coastline is in close proximity to the subduction zone capable of triggering tsunamis. In addition, in remote locations of Alaska, workers compensation extends coverage after the employee leaves the immediate work site. Other states such as Oregon and Hawaii can benefit from a warning advantage that would reduce the impact of tsunamis generated distances far away. A simplified model was formulated to estimate workers compensation loss due to tsunami inundation. This model is based on tsunami modeling developed for Japan, which makes use of historical data to derive a relationship between earthquake moment magnitude ( $M_w$ ), distance from the earthquake rupture to the shore, and direct or indirect exposure to the wave to determine the run-up height of a tsunami wave. The quantity of historical data needed to develop such a relationship is not available for Alaska; however, the model adopts the Japanese method where the detailed physics of the wave are not being calculated.

### Injury Rate

Casualties due to tsunami run-up are estimated by assuming a simple relationship between depth of inundation and the likelihood of being in one of four NCCI injury classes (outpatient treatment, minor/temporary disability, major/permanent disability, and death). There is scarce data available and the conditions under which the casualties occur is extremely variable. For this simplified approach, the injury relationships were subjected to the 1964 Mega-Thrust earthquake and the relationships calibrated to produce roughly the casualties suffered in the event.

### Earthquake Modeling

The source of tsunami in Alaska is limited to the lengthy subduction zone that lies along the undersea trench that stretches from about Seward to the tip of the Aleutians. This subduction zone produces earthquake magnitudes estimated to be as large as  $M_w$  9.2. Only the larger magnitude events have a potential for causing tsunami. For this analysis, magnitudes down to  $M_w$  7.7 were considered. Based on the geometry of the subduction zone adopted from the USGS, ruptures of magnitudes between  $M_w$  9.2 and  $M_w$  7.7 were

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placed along the length of the trench. The frequency of each event, as a function of magnitude, was derived from an analysis of the earthquake catalog for the region. For each earthquake rupture, the surface distance between any location on the rupture plane and each near shore business location was calculated.

**Analysis**

The computations were performed for each earthquake rupture and for each site. Given the magnitude of the rupture and the distance from the ruptures to the site, the simplified equation estimates the run-up height. The difference between the elevation above sea level and the run-up height determines the depth of inundation. Inundation depth is then used to determine the percentage of employees who are in each injury category. From the number of employees at the location, the total casualty cost is estimated using NCCI-provided mean costs for each injury category. The cost is multiplied by the event frequency, and aggregated by NCCI occupancy class and by county. The losses from earthquake shaking and tsunami were combined through summation. This conservative treatment neglects the potential for overlap in casualties caused by shaking and by tsunami.

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**EXHIBIT 1  
BASIC MANUAL  
MISCELLANEOUS VALUES PAGES  
APPLICABLE TO VOLUNTARY POLICIES**

Terrorism ..... See below:

State	Current Loss Cost	Proposed Loss Cost	Current Rate	Proposed Rate
Tennessee	0.02	0.01	N/A	N/A

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**EXHIBIT 2  
BASIC MANUAL  
MISCELLANEOUS VALUES PAGES  
APPLICABLE TO VOLUNTARY POLICIES**

Catastrophe (other than Certified Acts of Terrorism) ..... See below:

<b>State</b>	<b>Loss Cost</b>	<b>Rate</b>
Tennessee	0.02	N/A

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**EXHIBIT 3  
TERRORISM LOSS COSTS FOR STATES MODELED BY EQECAT**

State	Loss Cost per Employee (exc. LAE)	Loss Cost per Employee (exc. LAE)	Estimated Impact of TRIPRA**	State Average Weekly Wage***	Loss Cost per \$100 of payroll (exc. LAE)	Loss Cost per \$100 of payroll (exc. LAE)	Selected Loss Cost (exc. LAE)
	Lower Range*	Upper Range*			Lower Range	Upper Range	
(1)	(2)	(3)	(4)	(5)	(6) <sup>1</sup>	(7) <sup>2</sup>	(8)
Arizona	1.19	14.30	55%	731.68	0.002	0.021	0.01
DC	45.80	549.57	60%	951.91	0.056	0.666	0.04
Florida	0.59	7.12	85%	723.52	0.001	0.016	0.01
Georgia	0.79	9.50	80%	750.27	0.002	0.019	0.01
Illinois	4.29	51.46	45%	772.23	0.005	0.058	0.03
Indiana	0.31	3.75	95%	707.18	0.001	0.010	0.01
Iowa	0.63	7.57	90%	667.50	0.002	0.020	0.01

\* Source: Loss cost information developed by EQECAT for terrorism events

\*\* This adjustment reflects the impact of TRIPRA relative to terrorism events

\*\*\* 2007 U.S. Bureau of Labor Statistics, Current Population Survey

<sup>1</sup> Column (6) = (2) x (4) / ((5) x 52 / 100)

<sup>2</sup> Column (7) = (3) x (4) / ((5) x 52 / 100)

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TERRORISM LOSS COSTS INCLUDING LAE BY STATE**

<b>State</b> <b>(1)</b>	<b>Proxy State</b> <b>(2)</b>	<b>Selected Terrorism Loss Cost (exc. LAE)</b> <b>(3)</b>	<b>Loss-Based Expense Factor</b> <b>(4)</b>	<b>Terrorism Loss Cost (inc. LAE)</b> <b>(5) = (3) x (4)</b>
Tennessee	Iowa	0.01	1.193	0.01

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STATISTICAL CODES AND FORMS****EXHIBIT 5  
TERRORISM VOLUNTARY AND ASSIGNED RISK RATES BY STATE**

State	Selected Terrorism Voluntary Loss Cost (exc. LAE)	Voluntary PLR	Selected Terrorism Voluntary Rate	Assigned Risk PLR	Selected Terrorism Assigned Risk Rate
(1)	(2)	(3)	(4) = (2) / (3)	(5)	(6) = (2) / (5)
Tennessee	0.01	N/A	N/A	0.5142	0.02

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STATISTICAL CODES AND FORMSEXHIBIT 6  
ESTIMATED IMPACT OF CHANGES IN TERRORISM PROVISIONS BY STATE

State (1)	Current Terrorism Loss Cost (exc. LAE)		Proposed Terrorism Loss Cost (exc. LAE)		Avg. Non- Terrorism Loss Cost (exc. LAE)	Percentage Impact of Terrorism Loss Cost (6) = (4) / (5) -0.6%	CY 2006 WC Written Premium (\$ 000) (7) 947,781	Estimated Premium Impact (\$ 000) (8) = (6) x (7) (6,037)
	(2)	(3)	(4)	(5)				
Tennessee	0.02	0.01	-0.01	1.57				

**ITEM 01-TN-2008—CATASTROPHE PROVISIONS MISCELLANEOUS VALUES, RULES,  
STATISTICAL CODES AND FORMS****EXHIBIT 7  
CATASTROPHIC INDUSTRIAL ACCIDENT LOSS COSTS FOR STATES MODELED BY EQECAT**

State (1)	Catastrophic Industrial Accident Loss Cost per \$100 of payroll (exc. LAE)		Payroll (00) (3)
	(2)	(3)	
Florida	0.005	1,791,593,039	
Illinois	0.007	1,551,847,685	
Kansas	0.003	307,463,587	
Kentucky	0.019	298,315,385	
Louisiana	0.018	343,231,299	
North Carolina	0.004	834,624,171	
All States	0.007	5,127,075,166	

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EARTHQUAKE LOSS COSTS FOR STATES MODELED BY EQECAT**

State (1)	Earthquake Loss Cost per \$100 of payroll (exc. LAE) (2)
Alaska	0.024
Arkansas	0.007
Hawaii	0.014
Missouri	0.008
Nevada	0.003
Oregon	0.005
South Carolina	0.003
Tennessee	0.009
Utah	0.005

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**EXHIBIT 9  
CATASTROPHE (OTHER THAN CERTIFIED ACTS OF TERRORISM) LOSS COSTS  
INCLUDING LAE BY STATE**

State (1)	Selected Industrial Accident Loss Cost (exc. LAE) (2)	Indicated Earthquake Loss Cost (exc. LAE) (3)	Loss-Based Expense Factor (4)	Catastrophe Loss Cost (inc. LAE) (5) = [(2) + (3)] x (4)
Tennessee	0.005	0.009	1.193	0.02

**ITEM 01-TN-2008—CATASTROPHE PROVISIONS MISCELLANEOUS VALUES, RULES,  
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**EXHIBIT 10  
CATASTROPHE (OTHER THAN CERTIFIED ACTS OF TERRORISM) VOLUNTARY  
AND ASSIGNED RISK RATES BY STATE**

State (1)	Selected Catastrophe Voluntary Loss Cost (exc. LAE)		Voluntary PLR (3)	Selected Catastrophe Voluntary Rate (4) = (2) / (3)	Assigned Risk PLR (5)	Selected Catastrophe Assigned Risk Rate (6) = (2) / (5)
	(2)	N/A				
Tennessee	0.014		N/A	N/A	0.5142	0.03

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ESTIMATED IMPACT OF CHANGES IN CATASTROPHE PROVISIONS BY STATE

State	Current		Proposed		Avg. Non-Terrorism Loss Cost (inc. LAE) = (4) / (5)	Percentage Impact of Terrorism Loss Cost (inc. LAE) = (4) / (5)	CY 2006 WC Written Premium (\$ 000)	Estimated Premium Impact (\$ 000)
	DTEC Loss Cost	Proposed Catastrophe Loss Cost (inc. LAE)	Change in Catastrophe Loss Cost (inc. LAE)	Avg. Non-Terrorism Loss Cost (inc. LAE)				
(1)	(2)	(3)	(4)	(5)	(6) = (4) / (5)	(7)	(8) = (6) x (7)	
Tennessee	0.02	0.01	-0.01	1.87	-0.5%	947,781	(5,060)	

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EXHIBIT 12  
BASIC MANUAL  
MISCELLANEOUS VALUES PAGES  
ADVISORY LOSS COST PAGES

~~Foreign~~-Terrorism (Advisory Loss Cost)..... X.XX

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**EXHIBIT 13  
BASIC MANUAL  
MISCELLANEOUS VALUES PAGES  
ADVISORY LOSS COST PAGES**

**Domestic Terrorism, Earthquakes and catastrophic Industrial Accidents Catastrophe (other than Certified  
Acts of Terrorism) (Advisory Loss Cost)... X.XX**

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**EXHIBIT 14  
BASIC MANUAL—2001 EDITION  
RULE 3—RATING DEFINITIONS AND APPLICATION OF PREMIUM ELEMENTS  
A. EXPLANATION AND APPLICATION**

**24. Catastrophe Provisions**

a. **Terrorism Risk Insurance Act (TRIA) of 2002** and any amendments thereto enacted by Congress.  
**b. Domestic Terrorism, Earthquakes, and Catastrophic Industrial Accidents (DTEC) Catastrophe (other than Certified Acts of Terrorism)** Premium for Domestic Terrorism, Earthquakes, and Catastrophic Industrial Accidents Catastrophe (other than Certified Acts of Terrorism) is calculated on the basis of total payroll according to Rule 2. A risk's total payroll in each state is divided by units of \$100 and multiplied by the appropriate value found in the state pages. The calculation is expressed as (Payroll/100 x DTEC Catastrophe (other than Certified Acts of Terrorism) Value = Premium). This premium is applied after standard premium and is not subject to any other modifications including, but not limited to, premium discount, experience rating, schedule rating, or retrospective rating.

Unless an "If Any" policy develops premium during the policy term or at audit, policies issued on an "If Any" basis will not be charged this premium.

Per capita charges are not subject to premium under this Act.

**c. Foreign Terrorism**

Premium for Foreign Terrorism is calculated on the basis of total payroll according to Rule 2. A risk's total payroll in each state is divided by units of \$100 and multiplied by the appropriate value found in the state pages. The calculation is expressed as (Payroll/100 x Foreign Terrorism Value = Premium). This premium is applied after standard premium and is not subject to any other modifications including, but not limited to, premium discount, experience rating, schedule rating, or retrospective rating.

Unless an "If Any" policy develops premium during the policy term or at audit, policies issued on an "If Any" basis will not be charged this premium.

Per capita charges are not subject to premium under this Act.

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**EXHIBIT 15  
BASIC MANUAL—2001 EDITION  
MISCELLANEOUS RULES**

**TENNESSEE WORKERS COMPENSATION PREMIUM ALGORITHM**

The following algorithm provides the framework for premium charges and credits. Where not specified, the premium base would be the result from the prior line.\*

	PREMIUM ELEMENTS	EXPLANATORY NOTES
	<b>MANUAL PREMIUM</b>	$[(\text{PAYROLL} / 100) * \text{RATE}]$
+	Supplementary Disease (foundry, abrasive, sandblasting)	$[(\text{SUBJECT PAYROLL} / 100) * \text{DISEASE RATE}]$
+	USL&H Exposure for non-F classification codes	$[(\text{SUBJECT PAYROLL} / 100) * (\text{RATE} * \text{USL&H FACTOR})]$
	<b>TOTAL MANUAL PREMIUM</b>	
+	Employers Liability (E/L) increased limits factor	[% applied to Total Manual Premium]
+	Employers Liability increased limits charge	[Balance to E/L increased limits minimum premium]
+	Employers Liability increased limits factor (Admiralty, FELA)	[Factor applied to the portion of Manual Premium where Admiralty/FELA coverage is applicable]
-	Small Deductible credit	[% applied to Total Manual Premium]
+	Employers Liability/Voluntary Compensation flat charge	[Coverage in Monopolistic State Funds]
	<b>SUBJECT PREMIUM</b>	
x	Drug-Free Workplace Premium factor (1 – DFW credit %)	
	<b>TOTAL SUBJECT PREMIUM</b>	
x	Experience Modification (Exp Mod)	
x	Coal Mine Premium Transition Credit factor	
	<b>TOTAL MODIFIED PREMIUM</b>	
x	Schedule Rating factor (1 – SR credit %) or (1 + SR debit %)	
+	Supplemental Disease Exposure (Asbestos, NOC) <sup>†</sup>	
+	Atomic Energy Radiation Exposure NOCT <sup>†</sup>	
+	Charge for nonratable catastrophe loading <sup>†</sup>	
+	Aircraft Seat Surcharge	
+	Balance to Minimum Premium (State Act)	[Balance to minimum premium at Standard Limits]
+	Balance to Minimum Premium (Admiralty, FELA)	
	<b>TOTAL STANDARD PREMIUM<sup>‡</sup></b>	
-	Premium Discount <sup>§</sup>	[% of Standard Premium]
+	Coal Mine Disease Charge	[Underground, surface, surface auger]

\* The above rating method would be used in absence of independent carrier filings.

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**EXHIBIT 15 (CONT'D)  
BASIC MANUAL—2001 EDITION  
MISCELLANEOUS RULES**

PREMIUM ELEMENTS		EXPLANATORY NOTES
+ Expense Constant		
+ Foreign Terrorism		$[(\text{PAYROLL} / 100) * \text{FOREIGN TERRORISM VALUE}]$
+ Domestic Terrorism, Earthquakes, and Catastrophic Industrial Accident (DTEC) Catastrophe (other than Certified Acts of Terrorism)		$[(\text{PAYROLL} / 100) * \text{DTEC CATASTROPHE (OTHER THAN CERTIFIED ACTS OF TERRORISM) VALUE}]$
<b>ESTIMATED ANNUAL PREMIUM</b>		

NOC = Not Otherwise Classified.

- † Nonratable Element Premiums generated by nonratable portion of manual rate are subject to all applicable premium elements applied to the policy, however, not subject to experience rating or retrospective rating.
- ‡ Statistical calls for ratemaking data contain a different definition of "Standard Premium." Refer to the *Reporting Guidebook for the Annual Calls for Experience*.
- § For policies subject to premium adjustments under a retrospective rating plan, premium discount does not apply.

**Note:** For short rate cancellations, short rate percentage/short rate penalty premium factor is subject to experience rating, included in Total Subject Premium, and applied prior to Experience Modification.

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**EXHIBIT 16-A  
URE WORKERS COMPENSATION STATISTICAL PLAN  
PART 7—CODING SPECIFICATIONS**

**9. STATISTICAL CODES—PREMIUM AMOUNT *NOT SUBJECT TO EXPERIENCE MODIFICATION FACTOR***

Description	Stat Code	Premium Credit (–) or Debit (+)	Applicable States	Effective Date	Discontinuation Date
Catastrophe Provisions for Foreign Terrorism—Not Subject to Experience Rating	9740	+	All States Except AK, FL, HI, MO, NM	01/06	08/31/08
			FL, HI, MO, NM	01/06	12/31/07
			AK	01/06	01/06/08
Catastrophe Provisions for Terrorism—Not Part of Standard Premium	9740	+	All States	09/01/08	

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**EXHIBIT 16-B  
URE WORKERS COMPENSATION STATISTICAL PLAN  
PART 7—CODING SPECIFICATIONS**

**9. STATISTICAL CODES—PREMIUM AMOUNT NOT SUBJECT TO EXPERIENCE MODIFICATION FACTOR**

Description	Stat Code	Premium Credit (–) or Debit (+)	Applicable States	Effective Date	Discontinuation Date
Catastrophe Provisions for Domestic Terrorism, Earthquakes, and Industrial Accidents	9741	+	All States Except AK, FL, HI, MO, NM	01/01/05	08/31/08
			AR, TN	07/01/05	08/31/08
Catastrophe Provisions for Catastrophe (other than Certified Acts of Terrorism)	9741	+	All States Except AK, FL, MO, NM	09/01/08	

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**EXHIBIT 17  
URE WORKERS COMPENSATION STATISTICAL PLAN  
PART 3—EXPOSURE INFORMATION**

**14. STATISTICAL CODES—PREMIUM AMOUNT NOT SUBJECT TO EXPERIENCE MODIFICATION  
FACTOR**

Report the premium credit or debit amount not subject to experience modifications. These premiums should be reported separately from class code exposures and premiums under the designated class code or statistical code. These premiums are generated from the following premium programs or coverages:

- Catastrophe Provisions for Domestic Terrorism, Earthquakes, and Industrial Accidents ~~Catastrophe (other than Certified Acts of Terrorism)~~
- Catastrophe Provisions for Foreign Terrorism

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**EXHIBIT 18-A  
STATISTICAL PLAN—2008 EDITION  
PART 6—CODING VALUES  
H. STATISTICAL CODES**

**3. PREMIUM AMOUNT NOT PART OF STANDARD PREMIUM**

Description	Stat Code	Premium Credit (–) or Debit (+)	Applicable States	Effective Date	Discontinuation Date
Catastrophe Provisions for Foreign Terrorism—Not Subject to Experience Rating	9740	+	All States Except WV	01/06	08/31/08
			AK	01/06	01/06/08
			FL	01/06	12/31/07
			HI	01/06	12/31/07
			MO	01/06	12/31/07
			NM	01/06	12/31/07
			WV	07/06	08/31/08
Catastrophe Provisions for Terrorism—Not Part of Standard Premium	9740	+	All States	09/01/08	

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**EXHIBIT 18-B  
STATISTICAL PLAN—2008 EDITION  
PART 6—CODING VALUES  
H. STATISTICAL CODES**

**3. PREMIUM AMOUNT NOT PART OF STANDARD PREMIUM**

Description	Stat Code	Premium Credit (−) or Debit (+)	Applicable States	Effective Date	Discontinuation Date
Catastrophe Provisions for Domestic Terrorism, Earthquakes, and Industrial Accidents	9741	+	All States Except AK, AR, FL, HI, MO, NM, TN, WV	01/05	08/31/08
			AR	07/05	08/31/08
			TN	07/05	08/31/08
			WV	07/05	08/31/08
Catastrophe Provisions for Catastrophe (other than Certified Acts of Terrorism)	9741	+	All States Except AK, FL, MO, NM	09/01/08	

**ITEM 01-TN-2008—CATASTROPHE PROVISIONS MISCELLANEOUS VALUES, RULES,  
STATISTICAL CODES AND FORMS****EXHIBIT 19****FORMS MANUAL OF WORKERS COMPENSATION AND EMPLOYERS LIABILITY INSURANCE****TERRORISM RISK INSURANCE PROGRAM REAUTHORIZATION ACT ENDORSEMENT (WC 00-01-13-A)**

This endorsement addresses the requirements of the Terrorism Risk Insurance Act of 2002 as amended and extended by the Terrorism Risk Insurance Program Reauthorization Act of 2007.

**Definitions**

The definitions provided in this endorsement are based on and have the same meaning as the definitions in the Act. If words or phrases not defined in this endorsement are defined in the Act, the definitions in the Act will apply.

**"Act"** means the Terrorism Risk Insurance Act of 2002, which took effect on November 26, 2002, and any amendments thereto resulting from the Terrorism Risk Insurance Program Reauthorization Act of 2007.

**"Act of Terrorism"** means any act that is certified by the Secretary of the Treasury, in concurrence with the Secretary of State, and the Attorney General of the United States as meeting all of the following requirements:

- a. The act is an act of terrorism.
- b. The act is violent or dangerous to human life, property or infrastructure.
- c. The act resulted in damage within the United States, or outside of the United States in the case of the premises of United States missions or certain air carriers or vessels.
- d. The act has been committed by an individual or individuals as part of an effort to coerce the civilian population of the United States or to influence the policy or affect the conduct of the United States Government by coercion.

**"Insured Loss"** means any loss resulting from an act of terrorism (including an act of war, in the case of workers compensation) that is covered by primary or excess property and casualty insurance issued by an insurer if the loss occurs in the United States or at the premises of United States missions or to certain air carriers or vessels.

**"Insurer Deductible"** means, for the period beginning on January 1, 2008, and ending on December 31, 2014, an amount equal to 20% of our direct earned premiums, over the calendar year immediately preceding the applicable Program Year.

**"Program Year"** refers to each calendar year between January 1, 2008 and December 31, 2014, as applicable.

**Limitation of Liability**

The Act limits our liability to you under this policy. If aggregate Insured Losses exceed \$100,000,000,000 in a Program Year and if we have met our Insurer Deductible, we are not liable for the payment of any portion of the amount of Insured Losses that exceeds \$100,000,000,000; and for aggregate Insured Losses up to \$100,000,000,000, we will pay only a pro rata share of such Insured Losses as determined by the Secretary of the Treasury.

**Policyholder Disclosure Notice**

1. Insured Losses would be partially reimbursed by the United States Government. If the aggregate industry Insured Losses exceeds \$100,000,000 in a Program Year, the United States Government would pay 85% of our Insured Losses that exceed our Insurer Deductible.
2. Notwithstanding item 1 above, the United States Government will not make any payment under the Act for any portion of Insured Losses that exceeds \$100,000,000,000.

ITEM 01-TN-2008—CATASTROPHE PROVISIONS MISCELLANEOUS VALUES, RULES,  
STATISTICAL CODES AND FORMS

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EXHIBIT 19 (CONT'D)

FORMS MANUAL OF WORKERS COMPENSATION AND EMPLOYERS LIABILITY INSURANCE

3. The premiums charged for the coverage for Insured Losses under this policy are included in the amounts shown in Item 4 of the Information Page or in the Schedules in the Domestic Terrorism, Earthquakes, and Catastrophic Industrial Accidents Premium Endorsement (WC 00-04-21 B) and the Foreign Terrorism Premium Endorsement (WC 00-04-22), attached to this policy.

**ITEM 01-TN-2008—CATASTROPHE PROVISIONS MISCELLANEOUS VALUES, RULES,  
STATISTICAL CODES AND FORMS****EXHIBIT 20****FORMS MANUAL OF WORKERS COMPENSATION AND EMPLOYERS LIABILITY INSURANCE****DOMESTIC TERRORISM, EARTHQUAKES, AND CATASTROPHIC INDUSTRIAL ACCIDENTS  
CATASTROPHE (OTHER THAN CERTIFIED ACTS OF TERRORISM) PREMIUM ENDORSEMENT  
(WC 00 04 21 B C)**

This endorsement is notification that your insurance carrier is charging premium to cover the losses that may occur in the event of a Catastrophe (other than Certified Acts of Terrorism) as that term is defined below. domestic terrorism, earthquakes, and/or a catastrophic industrial accident. Your policy provides coverage for workers compensation losses caused by a Catastrophe (other than Certified Acts of Terrorism) acts-of domestic terrorism, earthquakes, and/or catastrophic industrial accident including workers compensation benefit obligations dictated by state law. Coverage for such losses is still subject to all terms, definitions, exclusions, and conditions in your policy, and any applicable federal and/or state laws, rules, or regulations. The premium charge provides funding for the risk of earthquakes, catastrophic industrial accidents, and acts of domestic terrorism. It The premium charge does not provide funding for Certified Acts of foreign Terrorism as that term is defined in the Foreign Terrorism Premium Endorsement (WC 00 04 22), attached to this policy contemplated under the Terrorism Risk Insurance Program Reauthorization Act Disclosure Endorsement (WC 00 04 22 A), attached to this policy.

For purposes of this endorsement, the following definitions apply:

- **Catastrophe (other than Certified Acts of Terrorism) Domestic Terrorism:** Any single event, resulting from an Earthquake, Noncertified Act of Terrorism, or Catastrophic Industrial Accident, which results in aggregate workers compensation losses in excess of \$50 million. All acts of terrorism, certified (as defined in the Terrorism Risk Insurance Act of 2002), or non-certified, that are outside the scope of the Foreign Terrorism Premium Endorsement (WC 00 04 22), and where aggregate workers compensation losses are in excess of \$50 million.
- **Earthquake:** The shaking and vibration at the surface of the earth resulting from underground movement along a fault plane or from volcanic activity where aggregate workers compensation losses from the single event are in excess of \$50 million.
- **Catastrophic Industrial Accident:** Any single event resulting in aggregate workers compensation losses in excess of \$50 million.
- **Noncertified Act of Terrorism:** An event that is not certified as an Act of Terrorism by the Secretary of Treasury pursuant to the Terrorism Risk Insurance Act of 2002 (as amended) but that meets all of the following criteria:
  - a. It is an act that is violent or dangerous to human life, property, or infrastructure;
  - b. The act results in damage within the United States, or outside of the United States in the case of the premises of United States missions, or air carriers, or vessels as those terms are defined in the Terrorism Risk Insurance Act of 2002 (as amended); and
  - c. It is an act that has been committed by an individual or individuals as part of an effort to coerce the civilian population of the United States or to influence the policy or affect the conduct of the United States Government by coercion.
- **Catastrophic Industrial Accident:** A chemical release, large explosion, or small blast that is localized in nature and affects workers in a small perimeter the size of a building.

**ITEM 01-TN-2008—CATASTROPHE PROVISIONS MISCELLANEOUS VALUES, RULES,  
STATISTICAL CODES AND FORMS****EXHIBIT 20 (CONT'D)****FORMS MANUAL OF WORKERS COMPENSATION AND EMPLOYERS LIABILITY INSURANCE**

The premium charge for the coverage your policy provides for workers compensation losses caused by a Catastrophe (other than Certified Acts of Terrorism) is shown in Item 4 of the Information Page or in the Schedule below.

Payroll State	Rate	Schedule	Premium
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**ITEM 01-TN-2008—CATASTROPHE PROVISIONS MISCELLANEOUS VALUES, RULES,  
STATISTICAL CODES AND FORMS****EXHIBIT 21****FORMS MANUAL OF WORKERS COMPENSATION AND EMPLOYERS LIABILITY INSURANCE****FOREIGN TERRORISM RISK INSURANCE PREMIUM PROGRAM REAUTHORIZATION ACT DISCLOSURE  
ENDORSEMENT (WC 00 04 22 A)**

This endorsement addresses the requirements of the Terrorism Risk Insurance Act of 2002 as amended and extended by the Terrorism Risk Insurance Program Reauthorization Act of 2007. This endorsement is notification. It serves to notify you of certain limitations under the Act, and that your insurance carrier is charging premium for losses that may occur in the event of an Act of foreign Terrorism.

Your policy provides coverage for workers compensation losses caused by Acts of Terrorism, including workers compensation benefit obligations dictated by state law. Coverage for such losses is still subject to all terms, definitions, exclusions, and conditions in your policy, and any applicable federal and/or state laws, rules, or regulations.

**Definitions**

The definitions provided in this endorsement are based on and have the same meaning as the definitions in the Act. If words or phrases not defined in this endorsement are defined in the Act, the definitions in the Act will apply.

"Act" means the Terrorism Risk Insurance Act of 2002, which took effect on November 26, 2002, and any amendments thereto resulting from the Terrorism Risk Insurance Program Reauthorization Act of 2007.

"Act of Terrorism" means any act that is certified by the Secretary of the Treasury, in concurrence with the Secretary of State, and the Attorney General of the United States as meeting all of the following requirements:

- a. The act is an act of terrorism.
- b. The act is violent or dangerous to human life, property or infrastructure.
- c. The act resulted in damage within the United States, or outside of the United States in the case of the premises of United States missions or certain air carriers or vessels.
- d. The act has been committed by an individual or individuals as part of an effort to coerce the civilian population of the United States or to influence the policy or affect the conduct of the United States Government by coercion.

"Insured Loss" means any loss resulting from an act of terrorism (and, except for Pennsylvania, including an act of war, in the case of workers compensation) that is covered by primary or excess property and casualty insurance issued by an insurer if the loss occurs in the United States or at the premises of United States missions or to certain air carriers or vessels.

"Insurer Deductible" means, for the period beginning on January 1, 2008, and ending on December 31, 2014, an amount equal to 20% of our direct earned premiums, over the calendar year immediately preceding the applicable Program Year.

"Program Year" refers to each calendar year between January 1, 2008 and December 31, 2014, as applicable.

For purposes of this endorsement, an "act of foreign terrorism" is defined as:

- a. Any act that is violent or dangerous to human life, property or infrastructure; and
- b. The act has been committed by an individual or individuals acting on behalf of any foreign person or foreign interest, as part of an effort to coerce the civilian population of the United States or to influence the policy or affect the conduct of the United States Government by coercion.

**ITEM 01-TN-2008—CATASTROPHE PROVISIONS MISCELLANEOUS VALUES, RULES,  
STATISTICAL CODES AND FORMS****EXHIBIT 21 (CONT'D)  
FORMS MANUAL OF WORKERS COMPENSATION AND EMPLOYERS LIABILITY INSURANCE****Limitation of Liability**

The Act limits our liability to you under this policy. If aggregate Insured Losses exceed \$100,000,000,000 in a Program Year and if we have met our Insurer Deductible, we are not liable for the payment of any portion of the amount of Insured Losses that exceeds \$100,000,000,000; and for aggregate Insured Losses up to \$100,000,000,000, we will pay only a pro rata share of such Insured Losses as determined by the Secretary of the Treasury.

**Policyholder Disclosure Notice**

1. Insured Losses would be partially reimbursed by the United States Government. If the aggregate industry Insured Losses exceed \$100,000,000 in a Program Year, the United States Government would pay 85% of our Insured Losses that exceed our Insurer Deductible.
2. Notwithstanding item 1 above, the United States Government will not make any payment under the Act for any portion of Insured Losses that exceed \$100,000,000,000.
3. The premium charge for the coverage your policy provides for workers compensation Insured Losses is included in the amount shown in Item 4 of the Information Page or in the Schedule below.

**Schedule**

<u>State</u>	<u>Rate per \$100 of payroll</u>	<u>Premium</u>
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