



Guideline

Subject: Earthquake Exposure Sound Practices

No: B-9 Date: May 1998

Executive Summary

This guideline sets out sound practices for the management and measurement of earthquake exposures. By the end of fiscal 1998, companies must use a computer model to estimate their probable maximum loss (PML) arising from a major earthquake. Alternatively, companies can use conservative default loss estimate (DLE) standards that are being developed by the Insurance Bureau of Canada and the industry and will be distributed subsequently as an appendix to this guideline. Although all insurers and reinsurers are encouraged to comply with the guideline, only those with exposure to the British Columbia and Québec markets are at present *required* to do so. For exposures *other than* in these two provinces, adherence to the guideline will be expected when DLE standards have been developed for all regions of Canada.

The guideline also sets out common parameters, insurance coverage information, risk characteristics and loss estimation factors to be considered in estimating PMLs. This information will enable OSFI to assess individual insurer's capacity and financial preparedness for a major earthquake.

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Definition of Earthquake Insurance

Earthquake insurance covers two principal risks: shake and fire-following. Shake insurance is usually sold as an endorsement or rider to an insurance policy and covers damages to property and contents. In addition, it may include business interruption, additional living expenses, automobile damage and other types of coverage.

Fire following an earthquake is the second main earthquake-related risk. Studies have shown that fire following damages can be quite severe because of broken gas mains, curtailment of water supply, road blockage for fire engines, etc. Coverage for damages from this risk may be sold as an endorsement or rider to an insurance policy (where legislation permits) or, alternatively, is sold as part of the standard property policy. Depending upon how this insurance is packaged, business interruption, additional living expenses, etc., may also be covered.

References in this guideline to earthquake insurance coverage include shake and fire-following risks.

Measurement of Earthquake Exposure

Definition of Probable Maximum Loss (PML)

For purposes of this guideline, PML is the threshold dollar value of losses beyond which losses caused by a major earthquake are unlikely. Gross PML is the PML amount *after* deductibles but *before* catastrophic and other reinsurance protection. Net PML is the PML *after* deductibles and catastrophic and other reinsurance protection.

Measurement of PML

Direct writers and reinsurers with earthquake exposure (any sum insured for earthquake perils) in either British Columbia or Québec should use a computer model¹ to estimate their gross and net PMLs starting no later than the end of fiscal 1998. Companies who prefer not to use a computer model may instead choose to comply with default loss estimate standards. These standards are under development and should be available later this year. They are based on aggregate data and simplifying assumptions, and have a built-in conservative bias. A model-generated PML estimate, based on more refined assumptions, is expected to yield a more reliable PML estimate. Direct writers and reinsurers that use computer models are expected to demonstrate an understanding of the model employed in estimating the company's PML including an understanding of the type of data and assumptions used in the model as well as the manner in which data and assumptions are incorporated. Companies need to have a sound understanding of the assumptions included in their PML estimates and the sensitivity of the estimates to changed assumptions.

Companies are also expected to compare their operative loss estimates with those generated by the default loss estimation factors. A company's understanding of the characteristics of its own portfolio, model and estimates will explain why its operative (model-generated) PML differs from the PML generated from the default loss estimation factors

Common Parameters

Data used in the calculation of the PML should be consistent, accurate and complete. In situations where companies do not capture policy-specific information, they will be expected to provide the basis and rationale for any estimates used. For the purpose of establishing a common standard for measuring an individual insurer's capacity and financial preparedness, the following parameters should be used:

- *Event Return Period*² : A minimum of 250 years (for deterministic models).
- *Loss Return Period*³: A minimum of 250 years (for probabilistic models).

¹ Computer models developed externally or internally may be used.

² Event return period corresponds to the reciprocal of the probability of an earthquake event occurring. For example, an event return period of 250 years equates to a .4 per cent (1/250) probability of a particular earthquake event occurring in a given year. Similarly, 100 years equates to a 1 per cent (1/100) annual probability of such an occurrence. Lower magnitude events (based on the Richter scale) occur more often than higher magnitude events and generally are expected to produce lower damage figures. A higher event return period translates into a lower probability of an earthquake occurrence, but a higher potential dollar value of loss.

³ Loss return period is the reciprocal of the annual probability of a certain loss level being exceeded for any possible earthquake event. Thus, a 200 year loss return period implies a .5 per cent (1/200) chance that a specified dollar loss will be exceeded in a given year.

- *Damageability Confidence Level⁴*: A minimum of 75 per cent for deterministic models and a minimum of 50 per cent for probabilistic models.
- *Location of Earthquake*: Distance from epicentre will affect damages sustained. Companies need to understand the type of mapping and how attenuation assumptions are derived.

Companies using deterministic computer models to estimate their PMLs will be expected to demonstrate that they have tested at least several different scenarios for earthquake event return periods. They will also be expected to demonstrate that they have used different locations of earthquakes with a view to selecting an appropriately conservative scenario vis-a-vis their portfolio mix.

In addition, the calculation of the PML should include the following common insurance coverage information, risk characteristics and loss estimation factors:

Insurance Coverage Information

- *Sums Insured*: Gross and net aggregates of property, contents, business interruption, additional living expenses, and other types of insurance likely to give rise to shake or fire-following claims. Aggregates must be segregated for shake and fire-following coverage and between personal and commercial business. As multi-location policies pose particular problems for the accurate coding and reporting of insurance information, a tool such as the Insurance Bureau of Canada's Commercial Property Statistical Plan should be used.
- *Deductibles*

Risk Characteristics

- *Age of buildings*: Refitted or renovated buildings should be recorded as having been built during the year that refitting or renovation work was completed.
- *Building Heights*: For both commercial and relevant residential buildings.
- *Occupancy*: For example, single residence dwelling, multi-residence dwelling, light industrial, etc.

⁴ The damageability confidence level is the probability that the actual damage ratio will be less than or equal to the damage ratio calculated by the model. For example, a 98 per cent damageability confidence level indicates that there is a 2 per cent probability that the actual damage to the building(s) will exceed the estimated damage, given that the earthquake has already occurred. This definition applies specifically for shake coverage and assumes the same probability for fire- following coverage.

- *Building Construction Classes:* use Applied Technology Construction (ATC) building construction classifications (e.g., masonry, steel, wood, etc.).
- *Geocoding:* Three-character postal code data.
- *Soil Conditions:* use independent, authoritative data (e.g., from Geological Survey Division of Natural Resources Canada).

Loss Estimation Factors

- *Post-Event Inflation:* Computer loss estimation models should include a factor for escalating costs in the aftermath of a major earthquake (e.g., prices for building supplies and labour are likely to increase after widespread destruction). Post-event inflation can add substantially to loss estimate figures.
- *Co-insurance or Under-insurance*
- *Loss Adjustment Expenses*
- *Debris Removal*

Automobile Physical Damage Exposure

Models do not generally incorporate an estimation of the PML figure arising from damage to automobiles. In the case of shake damage, this figure could be quite significant because of factors such as collapsed roofs over parking garages. Companies will be expected to move towards accumulating aggregate information for automobiles they have insured similar to that outlined in the *Sums Insured* section (under *Common Parameters*), pending the introduction of model improvements in this area. In the meantime, a PML estimate for automobile physical damage coverage should be made (e.g., a percentage factor times the total number of vehicles insured times an estimated average insured value per vehicle).

Fire-Following

Management should satisfy itself that the company's computer model provides a sound basis for estimating fire-following losses. Where this is not the case, companies will be expected to use the fire-following default loss estimates developed by the industry.

Exposure Management Test

A company's gross PML *must not exceed*, on an ongoing basis, the sum of the following financial resources, defined in Appendix 1:

- the earthquake reserve required by OSFI (ERRO);
- the amount of retention the company is currently using to manage its earthquake exposure, as defined in Appendix 1;
- documented reinsurance coverage;
- approved capital market financing, (see guideline page 8).

Companies will be required to meet this test of preparedness for a catastrophic earthquake by no later than the end of fiscal 1998.

OSFI has developed a formula for the establishment of reserves and specification of the amount of capital and surplus that can be used by a company to meet its gross PML. The formula is included in Appendix 1.

Management of Earthquake Insurance Risk

Board and Management Oversight

All companies with earthquake exposure in either British Columbia or Québec should have documented written policies and procedures outlining how they manage earthquake insurance risk. These policies and procedures should quantify the company's willingness to take on earthquake insurance risk (e.g., setting of prudential limits) and outline how the company's financial resources cover its calculated gross PML. They should also address, as a minimum, data quality and integrity, as well as contingency plans.

Policies and procedures should be developed by senior management and reviewed and approved, at least annually, by senior management and the board of directors (or an authorized committee of the board)⁵. All reviews should be documented. The board should ensure that management adheres to the earthquake exposure management policies and procedures.

Senior management should regularly review the company's estimated gross and net PMLs and review the adequacy of the company's financial resources in light of:

⁵ For Canadian branches of foreign companies, the board of directors should initially approve policies and procedures as well as any significant changes to them. The Canadian Chief Agent may fulfil the role of senior management and carry out the *recurring* functions of the board of a Canadian company described in this guideline.

- the company's results for other classes of business and in other geographical regions (to deal with the potential depletion of the company's current capital and surplus level); and
- current market conditions (e.g., availability of adequate catastrophic reinsurance protection for the coming year).

Senior management should review, at least annually, the probability of collection on a claim for their earthquake reinsurance coverage.

Management of companies using or proposing to use a computer loss estimation model must be able to demonstrate that they have thoroughly researched the model. This research should include a review of the type of data and assumptions used in the model as well as the reliability with which the data and assumptions are incorporated into the model.

Earthquake Reinsurance

Reinsurance programs should be arranged with sound and reputable reinsurers. When companies place reinsurance, a careful analysis of the claims-paying ability and creditworthiness of their reinsurers should be undertaken at the outset. This analysis should be repeated at least once a year.

The analysis of a reinsurer normally includes a review of the reinsurer's financial statements. A review of reinsurers approved in Canada may be less comprehensive than that for those that are not approved. An analysis of an affiliated or non-affiliated reinsurer would usually consider these factors:

- adequacy of the reinsurer's capital base;
- the reinsurer's earnings performance over the last several years;
- the financial strength and commitment of the reinsurer's shareholders;
- the quality of the regulatory regime in which the reinsurer is based;
- the expertise, reputation and integrity of the reinsurer's management;
- the reinsurer's track record of reimbursement following previous catastrophes (if applicable); and
- the length of time the reinsurer has been in existence.

Such an analysis could be undertaken by rating agencies, reinsurance brokers or other reputable agents or intermediaries on behalf of the company. In addition, a company (or appropriate entity acting for the company) should ascertain whether the statements have been audited by an internationally recognised accounting firm and should review the scope of the audit (e.g., does the audit opinion contain a reservation?).

For Canadian branches and Canadian subsidiaries of foreign companies, reinsurance programs are often arranged through the head office of the parent institution. Information demonstrating a viable reinsurance program for Canadian earthquake insurance risk should be readily available at the offices of the branch or subsidiary for review by OSFI examiners.

Companies must comply with the *Reinsurance Regulations* and its limit on the use of non-approved reinsurance.

Capital Market Financing

Some insurance companies have accessed the capital markets with innovative financing transactions designed to hedge their risk for a catastrophic event. In some cases, these are standby capital market financing facilities that become operative when a catastrophe occurs.

Such financing arrangements are precedent-setting in Canada and prior approval is required from OSFI. Companies also need to respect the provisions of the *Property and Casualty Borrowing Regulations*. These regulations prescribe that debt obligations not exceed 2 per cent of total assets.

The minimum conditions to be met by companies seeking OSFI approval for capital market financing arrangements include:

- the risk has been or will be genuinely laid off to investors that meet suitable counterparty standards;
- the catastrophe-linked financial instruments are subordinated to the interests of policyholders and other creditors;
- the redemption of catastrophe-linked financial instruments will require OSFI's prior approval;
- the capital instrument is an appropriate substitute for the usual financial resources available to meet gross PML;
- under standby arrangements, capital will be forthcoming immediately after a catastrophic earthquake with no preconditions that prevent or delay the infusion of capital; and
- adequate disclosure regarding the catastrophic financial arrangements will be made in the notes to the company's financial statements (in accordance with GAAP).

Parental Backing

Formal reinsurance agreements, evidenced by written documents between Canadian-incorporated insurance companies and their foreign parent institutions, constitute a traditional

mechanism with which insurers manage their insurance exposure. OSFI considers these arrangements to be among the financial resources available to meet earthquake insurance claims.

Other supporting financial arrangements provided by parent companies, such as letters of credit or guarantee facilities, cannot be used.

Contingency Plans

Companies must have contingency plans in place to ensure continued efficient business operations. In the case of earthquake risk, the contingency plan should address the key elements of claims management, such as emergency communications links, availability and adequacy of claims and adjustment service personnel, and off-site systems back-up, that also includes reinsurance records.

EARTHQUAKE RESERVE REQUIRED BY OSFI

Earthquake Reserve Formula

$$\text{ERRO} = \text{EPR} + \text{ERC}$$

$$\text{ERC} = \text{PML}_{250} + \text{N}/25 (\text{PML}_{500} - \text{PML}_{250}) - \text{Reinsurance} - \text{Retention} - \text{Approved capital} - \text{EPR}$$

Collectable market financing

where:

ERRO	earthquake reserve required by OSFI.
EPR	earthquake premium reserve which consists of the voluntary ¹ accumulation of the earthquake premiums as defined below. This EPR must be less than or equal to net PML ₅₀₀ . Any earthquake premium contributed to the EPR must remain in the EPR unless there is a material decrease in exposure.
Earthquake Premiums:	an amount not exceeding 75 per cent of (current year's earned policyholders earthquake premiums - cost of earthquake reinsurance). In the case of catastrophic reinsurance coverage not specifically written for earthquake risks, an allocation of the premium amount must be made. Companies should be able to demonstrate the reasonableness of their rate-making procedures.
ERC	earthquake reserve complement, the additional component (if necessary) of ERRO needed to achieve financial preparedness according to the formula. The ERC must always be greater than or equal to 0.
N	current fiscal year minus 1997.
Gross PML:	PML amount estimated <i>after</i> policyholders' deductibles but <i>before</i> reinsurance protection.
Net PML:	PML amount estimated <i>after</i> policyholders' deductibles and <i>after</i> reinsurance protection.
PML ₂₅₀	gross PML estimated using a 250 year <i>event</i> return period at a 75 per cent damageability confidence level for deterministic models or a 250 year <i>loss</i> return period at a 50 per cent damageability confidence level for probabilistic models.
PML ₅₀₀	gross PML estimated using a 500 year <i>event</i> return period at a 75 per cent damageability confidence level for deterministic models or a 500 year <i>loss</i> return period at a 50 per cent damageability confidence level for probabilistic models.

¹ The Office will monitor the build-up of earthquake premiums and consider the necessity of requiring insurers to set up an EPR.

Retention:	amount of retention the company is currently using to manage its earthquake exposure subject to a maximum of 10 per cent of Capital & Surplus as defined below.
Capital & Surplus:	<i>total capital, surplus and reserves</i> reported on the latest P&C-1 Annual Return for Canadian-incorporated companies (exhibit 20.20, line 49); and <i>worldwide capital and surplus</i> (in Canadian dollars) reported on the latest P&C-2 Annual Return for Canadian branches of foreign insurance companies (exhibit 10.60, line 22, column 5).
Reinsurance collectable:	amounts that would be collectible under the current reinsurance program of the company if it sustains earthquake losses that match the current year's preparedness standard. (e.g., for the year 1999: the amount of reinsurance that would be collectible by a company experiencing losses equal to $PML_{250+2/25}$ ($PML_{500} - PML_{250}$)).

Reserve Formula Specifications

- All companies must meet a test of financial preparedness for a 250 year return period earthquake event by no later than the end of fiscal year 1998. Companies already prepared for a 250 year event may in any year set aside earthquake premiums in the EPR. Preparedness for a 250 year event must remain in place after the end of fiscal year 1998, unless there is a material change in exposure. An increase in exposure would force companies to increase their preparedness while a decrease in exposure might decrease the required ERRO.
- Companies have 25 years to build their gross PML to the PML_{500} level. This level must be reached by the end of fiscal 2022.

Accounting and Statutory Treatment

The provision for earthquake exposures (ERRO) is to be reported in the P&C-1 and P&C-2 Returns on Page 20.20, line 40 (Reserves Required). In addition, the breakdown of ERRO into ERC and EPR should be reported on Page 30.15, lines 34 and 35 respectively. ERRO constitutes an amount to be added to total liabilities for purposes of the MAT/DAT Tests as an "Additional Policy Provision" (Page 30.10, line 44).

Should an earthquake occur and trigger claims, companies would establish an unpaid claims provision as well as a provision for claims adjustment expenses. The ERRO, starting with the EPR component, would be reduced by an amount equal to the claims reserves. Any reduction in ERRO should be brought back into unappropriated surplus immediately.

The appropriateness of the reserve formula and its related parameters will be reassessed through a dynamic process which will take into account the information gathered through appointed actuaries' reports as well as further discussions with the industry and professional associations. Special circumstances or occurrences which may have a material impact on current conditions may warrant OSFI's reassessment of reserving procedures for earthquake exposures.

DEFAULT LOSS ESTIMATES

The Guideline on Earthquake Exposure Sound Practices applies to all insurers and reinsurers that have exposure to the British Columbia or Quebec markets. By the end of fiscal 1998, these companies must estimate their probable maximum loss (PML) arising from a major earthquake.

For reporting purposes, companies may use a computer model to estimate their PML, or they may choose to use a "default" PML estimate, which is calculated by applying the attached Default Loss Estimate (DLE) factors to sums insured. Irrespective of the method chosen to generate the PML estimate that is ultimately used for reporting purposes, all companies must calculate a default PML estimate using the DLE factors.

In general, a company's model-generated PML estimate for its particular portfolio will yield a more reliable estimate than the default PML estimate. The aggregate data and simplifying assumptions in the DLE factors (which include a built-in conservative bias) used to generate the default PML are not as sophisticated as the assumptions that a company can use in a model-generated PML, nor are they tailored to the portfolio in question.

Companies that use a model-generated PML must compare it to their default PML estimate, and demonstrate an understanding of the key reasons for the difference between the two estimates. A company's understanding of the characteristics of its own portfolio, model, and estimates will typically explain why its model-generated PML differs from the default PML generated from the DLE factors.

The attached DLE factors relate to exposures in British Columbia and Quebec only. The industry, through the Insurance Bureau of Canada (IBC), has agreed to update these figures periodically to recognize changes in modelling technology and in default assumptions. Development of DLE factors for all regions in Canada will be considered for future revisions of this guideline.

How to use these Default Loss Estimate Factors

Default loss estimates (DLE) are provided below for CRESTA zones (groupings of postal codes). To use these DLE factors, companies must first calculate earthquake exposure (total sums insured) by line of business (shake, fire, personal property, and commercial property), for each CRESTA zone. These sums insured, for each line, are then multiplied by the appropriate DLE factor, found in the following table. This calculation produces a default PML by CRESTA zone for shake and fire, personal property and commercial property. These amounts by line, and by CRESTA zone are then totalled to provide the aggregate default PML estimate. Companies using model-generated PMLs for reporting purposes should compare the model-based estimate against the default PML estimate.

In comparing the model-generated PML with the default PML, companies should demonstrate an understanding of the assumptions and data used to generate the company's model-generated PML. This will typically include an understanding of the following areas:

- deductibles on shake coverage for buildings and contents;
- deductibles on fire following coverage;
- mix of personal property occupancy types in the portfolio (e.g., distribution of risks between single family dwellings and multi-family dwellings);
- mix of construction classes in the portfolio (e.g., distribution by Canadian fire classification);
- mix of coverage offered for building, contents and additional living expenses;
- mix of coverage offered for building, contents and business interruption;
- confidence levels (if appropriate); and
- return periods under study.

Where possible, the company's information on each of these items should be compared with the assumptions used in generating the default loss estimates. The DLE factors were generated using probabilistic models under the following assumptions:

- 5% deductible on shake coverage for buildings and contents;
- no deductible for fire following coverage;
- 100% single family occupancy assumed for personal property;
- default values for construction, height, age and commercial occupancy (varies model to model);
- personal risks assumed values in the following ratio: 55% building, 39% contents, 6% additional living expenses;
- commercial risks assumed values in the following ratio: 50% building, 38% contents and 12% business interruption;
- 90% confidence level (in models where relevant); and
- 250 year return period.

The estimates used to generate the DLE factors do not explicitly include items such as post-event inflation, co-insurance or under-insurance, loss adjustment expenses, or debris removal, because the models used to develop the DLE factors do not incorporate these items on a uniform basis. (OSFI expects that the models will be enhanced over time to more satisfactorily take into consideration such items.) However, the conservative bias in the DLE factors will, in general, reflect the impact of the above-noted items.

Insurers who use the DLE factors to estimate their PML will be considered to be in compliance with the required *insurance coverage information, risk characteristics, and loss estimation factors*, specified on pages four and five of this guideline. No additional adjustments to the estimate will be required.

DEFAULT LOSS ESTIMATION FACTORS

British Columbia - Personal Property Shake				
CRESTA ZONE	POSTAL CODES	Total Sum Insured	250 shake factor %	500 shake factor %
Zone 1 Richmond, Fraser Delta	V3M, V4G, V4K, V6V-Y, V7A-E,		5.88	10.76
Zone 2 Rest of Greater Vancouver	Rest of V3, V4, V5, V6, V7		2.25	4.31
Zone 3 Victoria	V8N-Z, V9A-E		1.02	2.19
Zone 4 Rest of Vancouver Earthquake Zone	V8A, V8L, V9L-Y, V2P-Z, V0M-S, V0X, V1M, V4W, V4X, V4R, V3G		1.05	2.30
Zone 11 British Columbia excluding zones 1-4	remainder of V codes		0.03	0.07
Total BC personal property shake PML				
Note: Total sum insured x 250 shake factor = 250 shake PML for each CRESTA zone Total sum insured x 500 shake factor = 500 shake PML for each CRESTA zone				
Total = sum of shake PML for each CRESTA zone				
British Columbia - Personal Property Fire				
CRESTA ZONE	POSTAL CODES	Total Sum Insured	250 fire factor %	500 fire factor %
Zone 1 Richmond, Fraser Delta	V3M, V4G, V4K, V6V-Y, V7A-E,		2.02	2.90
Zone 2 Rest of Greater Vancouver	Rest of V3, V4, V5 V6, V7		2.36	3.09
Zone 3 Victoria	V8N-Z, V9A-E		0.98	0.94
Zone 4 Rest of Vancouver Earthquake Zone	V8A, V8L, V9L-Y, V2P-Z, V0M-S, V0X, V1M V4W, V4X, V4R, V3G		0.39	0.46
Zone 11 British Columbia excluding zones 1-4	remainder of V codes		0.03	0.03
Total BC personal property fire PML				
Note: Total sum insured x 250 fire factor = 250 fire PML for each CRESTA zone Total sum insured x 500 fire factor = 500 fire PML for each CRESTA zone				
Total = sum of fire PML for each CRESTA zone				

Quebec - Personal Property Shake				
CRESTA ZONE	POSTAL CODES	Total Sum Insured	250 shake factor %	500 shake factor %
Zone 5 Montreal	H		3.11	6.38
Zone 6 Greater Montreal	J3V-Z, J4, J5R, J6W-Z, J7A-R, J0N		1.69	4.12
Zone 7 Surroundings of Montreal	J2S-X, J3A-L, J5Y-Z, J6A-T, J7V-Z, J0J-L, J0P-S		1.85	4.18
Zone 8 Rest of Montreal Earthquake Zone	G8Y-Z, G9A-C, J1E-X, J2B-N, J3P-R, J5V, J8C-H, J0C-H, J0T-V, K6A-K, K0B-C		1.30	2.44
Zone 9 Quebec City and Epicentral Region	G1, G2, G5V, G6V-W, G0A, G0L, G0R, G0T		1.14	3.01
Zone 10 Rest of Quebec Earthquake Zone	G5L-R, G5Y, G6G-T, G7, G8B-H, G8T-Z, G9, G0K, G0M-P, G0S, G0V, G0X-Z		0.37	0.78
Zone 16 Quebec	excluding zones 5-10		0.77	1.40
Total Quebec personal property shake				
Note: Total sum insured x 250 shake factor = 250 shake PML for each CRESTA zone Total sum insured x 500 shake factor = 500 shake PML for each CRESTA zone				
Total = sum of shake PML for each CRESTA zone				

Quebec - Personal Property Fire				
CRESTA ZONE	POSTAL CODES	Total Sum Insured	250 fire factor %	500 fire factor %
Zone 5 Montreal	H		1.25	5.95
Zone 6 Greater Montreal	J3V-Z, J4, J5R, J6W-Z, J7A-R, J0N		0.40	1.27
Zone 7 Surroundings of Montreal	J2S-X, J3A-L, J5Y-Z, J6A-T, J7V-Z, J0J-L, J0P-S		0.28	0.87
Zone 8 Rest of Montreal Earthquake Zone	G8Y-Z, G9A-C, J1E-X, J2B-N, J3P-R, J5V, J8C-H, J0C-H, J0T-V, K6A-K, K0B-C		0.22	0.58
Zone 9 Quebec City and Epicentral Region	G1, G2, G5V, G6V-W, G0A, G0L, G0R, G0T		0.50	2.62
Zone 10 Rest of Quebec Earthquake Zone	G5L-R, G5Y, G6G-T, G7, G8B-H, G8T-Z, G9, G0K, G0M-P, G0S, G0V, G0X-Z		0.17	0.38
Zone 16 Quebec	excluding zones 5-10		0.07	0.38
Total Quebec personal property fire PML				
Note: Total sum insured x 250 fire factor = 250 fire PML for each CRESTA zone Total sum insured x 500 fire factor = 500 fire PML for each CRESTA zone				
Total = sum of fire PML for each CRESTA zone				

British Columbia - Commercial Property Shake				
CRESTA ZONE	POSTAL CODES	Total Sum Insured	250 shake factor %	500 shake factor %
Zone 1 Richmond, Fraser Delta	V3M, V4G, V4K, V6V-Y, V7A-E,		10.92	15.43
Zone 2 Rest of Greater Vancouver	Rest of V3, V4, V5 V6, V7		4.68	6.67
Zone 3 Victoria	V8N-Z, V9A-E		2.67	4.58
Zone 4 Rest of Vancouver Earthquake Zone	V8A, V8L, V9L-Y, V2P-Z, V0M-S, V0X, V1M, V4W, V4X, V4R, V3G		2.29	4.15
Zone 11 British Columbia excluding zones 1-4	remainder of V codes		0.10	0.13
Total BC commercial property shake PML				
Note: Total sum insured x 250 shake factor = 250 shake PML for each CRESTA zone Total sum insured x 500 shake factor = 500 shake PML for each CRESTA zone				
Total = sum of shake PML for each CRESTA zone				
British Columbia - Commercial Property Fire				
CRESTA ZONE	POSTAL CODES	Total Sum Insured	250 fire factor %	500 fire factor %
Zone 1 Richmond, Fraser Delta	V3M, V4G, V4K, V6V-Y, V7A-E,		0.94	1.26
Zone 2 Rest of Greater Vancouver	Rest of V3, V4, V5, V6, V7		1.52	1.80
Zone 3 Victoria	V8N-Z, V9A-E		0.56	0.69
Zone 4 Rest of Vancouver Earthquake Zone	V8A, V8L, V9L-Y, V2P-Z, V0M-S, V0X, V1M, V4W, V4X, V4R, V3G		0.22	0.30
Zone 11 British Columbia excluding zones 1-4	remainder of V codes		0.03	0.03
Total BC commercial property fire PML				
Note: Total sum insured x 250 fire factor = 250 fire PML for each CRESTA zone Total sum insured x 500 fire factor = 500 fire PML for each CRESTA zone				
Total = sum of fire PML for each CRESTA zone				

Quebec - Commercial Property Shake				
CRESTA ZONE	POSTAL CODES	Total Sum Insured	250 shake factor %	500 shake factor %
Zone 5 Montreal	H		5.43	10.74
Zone 6 Greater Montreal	J3V-Z, J4, J5R, J6W-Z, J7A-R, J0N		3.62	8.35
Zone 7 Surroundings of Montreal	J2S-X, J3A-L, J5Y-Z, J6A-T, J7V-Z, J0J-L, J0P-S		3.51	7.41
Zone 8 Rest of Montreal Earthquake Zone	G8Y-Z, G9A-C, J1E-X, J2B-N, J3P-R, J5V, J8C-H, J0C-H, J0T-V, K6A-K, K0B-C		2.77	4.66
Zone 9 Quebec City and Epicentral Region	G1, G2, G5V, G6V-W, G0A, G0L, G0R, G0T		2.35	4.61
Zone 10 Rest of Quebec Earthquake Zone	G5L-R, G5Y, G6G-T, G7, G8B-H, G8T-Z, G9, G0K, G0M-P, G0S, G0V, G0X-Z		0.80	1.52
Zone 16 Quebec	excluding zones 5-10		1.12	1.84
Total Quebec commercial property shake PML				
Note: Total sum insured x 250 shake factor = 250 shake PML for each CRESTA zone Total sum insured x 500 shake factor = 500 shake PML for each CRESTA zone				
Total = sum of shake PML for each CRESTA zone				

Quebec - Commercial Property Fire				
CRESTA ZONE	POSTAL CODES	Total Sum Insured	250 fire factor %	500 fire factor %
Zone 5 Montreal	H		0.45	1.49
Zone 6 Greater Montreal	J3V-Z, J4, J5R, J6W-Z, J7A-R, J0N		0.17	0.35
Zone 7 Surroundings of Montreal	J2S-X, J3A-L, J5Y-Z, J6A-T, J7V-Z, J0J-L, J0P-S		0.08	0.25
Zone 8 Rest of Montreal Earthquake Zone	G8Y-Z, G9A-C, J1E-X, J2B-N, J3P-R, J5V, J8C-H, J0C-H, J0T-V, K6A-K, K0B-C		0.08	0.23
Zone 9 Quebec City and Epicentral Region	G1, G2, G5V, G6V-W, G0A, G0L, G0R, G0T		0.22	0.57
Zone 10 Rest of Quebec Earthquake Zone	G5L-R, G5Y, G6G-T, G7, G8B-H, G8T-Z, G9, G0K, G0M-P, G0S, G0V, G0X-Z		0.08	0.13
Zone 16 Quebec	excluding zones 5-10		0.05	0.12
Total Quebec commercial property fire PML				
Note: Total sum insured x 250 fire factor = 250 fire PML for each CRESTA zone Total sum insured x 500 fire factor = 500 fire PML for each CRESTA zone				
Total = sum of fire PML for each CRESTA zone				

Quebec PML Comparison - Personal Property			
	shake PML	fire PML	total PML
Quebec personal property default PML 250			
Quebec personal property model - generated PML 250			
Difference			
Quebec personal property default PML 500			
Quebec personal property model - generated PML 500			
Difference			
Quebec PML Comparison - Commercial Property			
	shake PML	fire PML	total PML
Quebec commercial property default PML 250			
Quebec commercial property model - generated PML 250			
Difference			
Quebec commercial property default PML 500			
Quebec commercial property model - generated PML 500			
Difference			

BC PML Comparison - Personal Property			
	shake PML	fire PML	total PML
BC personal property default PML 250			
BC personal property model - generated PML 250			
Difference			
BC personal property default PML 500			
BC personal property model - generated PML 500			
Difference			
BC PML Comparison - Commercial Property			
	shake PML	fire PML	total PML
BC commercial property default PML 250			
BC commercial property model - generated PML 250			
Difference			
BC commercial property default PML 500			
BC commercial property model - generated PML 500			
Difference			

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