



OFFICE OF THE
Auditor General
of British Columbia

**Earthquake Preparedness:
Summary**

Performance Audit

Canadian Cataloguing in Publication Data

British Columbia. Office of the Auditor General.

Earthquake preparedness : summary

(Report ; 1997/1998: 1 – Summary)

“Performance audits.”

ISBN 0-7726-3432-7

1. Earthquakes – British Columbia – Safety measures – Evaluation. 2. Emergency management – British Columbia – Evaluation. 3. Disaster relief – British Columbia – Evaluation.

I. Title. II. Series: British Columbia. Office of the Auditor General.

Report ; 1997/98: 1 – summary.

HV551.5.C3B74 1997

363.34'957'09711

C97-960350-1



LOCATION:

**8 Bastion Square
Victoria, British Columbia
V8V 1X4**

OFFICE HOURS:

**Monday to Friday
8:30 a.m. – 4:30 p.m.**

TELEPHONE: (250) 387-6803

**Toll free through Enquiry BC at: 1-800-663-7867
In Vancouver dial 660-2421**

FAX: (250) 387-1230

INTERNET:

bcauditor@oag.bc.ca

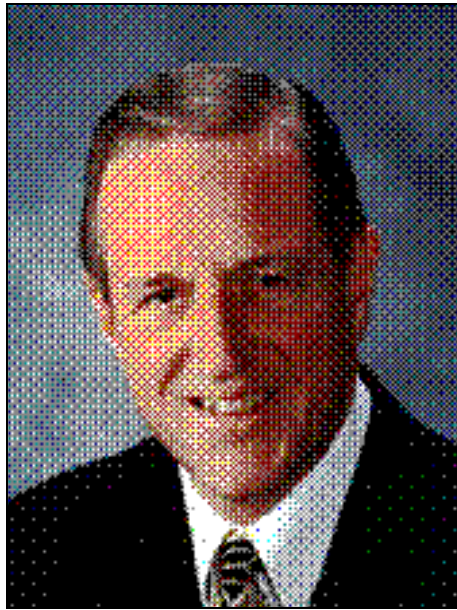
INTERNET HOMEPAGE:

**Further information and reports at:
<http://www.oag.bc.ca/>**

table of contents

Auditor General's Comments	1
Earthquake Preparedness: Summary	
Audit Purpose and Scope	5
Overall Conclusion	6
Key Findings	8
Factors Influencing the State of Earthquake Preparedness in British Columbia	13
Recommendations	16
In What Order Should the Provincial Government Implement the Recommendations?	26
Attorney General's Response	28

auditor general's comments



This document is a summary of the key points from my first report to the Legislative Assembly for the 1997/98 year. That report contains the detailed results of my Office's audit of the state of earthquake preparedness of British Columbia's provincial and local governments.

I was pleased to be able to carry out this audit while the "Blizzard of '96" is still fresh in many people's minds. The snowfalls that hit southwestern British Columbia at the end of last year awakened much of the general public to some of the issues that those in the emergency field are giving consideration to on a daily basis.

It is clear that a major—or catastrophic—earthquake will occur in our province at some point in the future. Even during the course of this audit, almost 1,000 small earthquakes were recorded in or near British Columbia, and three were strongly felt.

Earthquake preparedness covers a broad range of activities aimed at understanding the hazards, risks and vulnerabilities related to a major earthquake, mitigating the potential impacts of such an earthquake, and planning for the response to and recovery from one.

This was a challenging audit, as we were examining the state of preparedness of not just one government agency (the Provincial Emergency Program), but also the provincial government overall, and local governments.

We concluded that governments in British Columbia are not well prepared for a major earthquake. There are a number of factors that I believe have contributed to this situation. The Province is still relatively new to the business of preparing for a major earthquake, and it hasn't yet suffered the sort of serious earthquakes that other jurisdictions such as California have experienced. Consequently, the topic has never made it to the top of the political priority list, nor has it captured the interest of the public. Nevertheless, significant progress has been made over the years in some areas such as planning for response to an earthquake, and the fact that the Attorney General called for this audit suggests that the government is indeed interested in improving the state of preparedness.

This audit has highlighted many areas where specific improvements in preparedness are necessary, but also has resulted in nine strategic recommendations regarding action by government leaders that we believe is essential to create a more supportive and focused environment for earthquake preparedness activities.

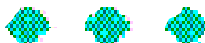
In formulating our recommendations, we have understood that preparedness for a major or catastrophic earthquake can never be absolute. Deaths, injuries and significant property damage are likely to be unavoidable. What preparedness can do, however, is reduce the scale of these impacts, help return life to normal sooner than would otherwise occur, and reduce the cost of recovery.

Achieving an adequate state of preparedness is a big task that will not be completed overnight. But I am sure it can be done over a reasonable length of time, providing there is continued commitment and leadership at all levels of government.

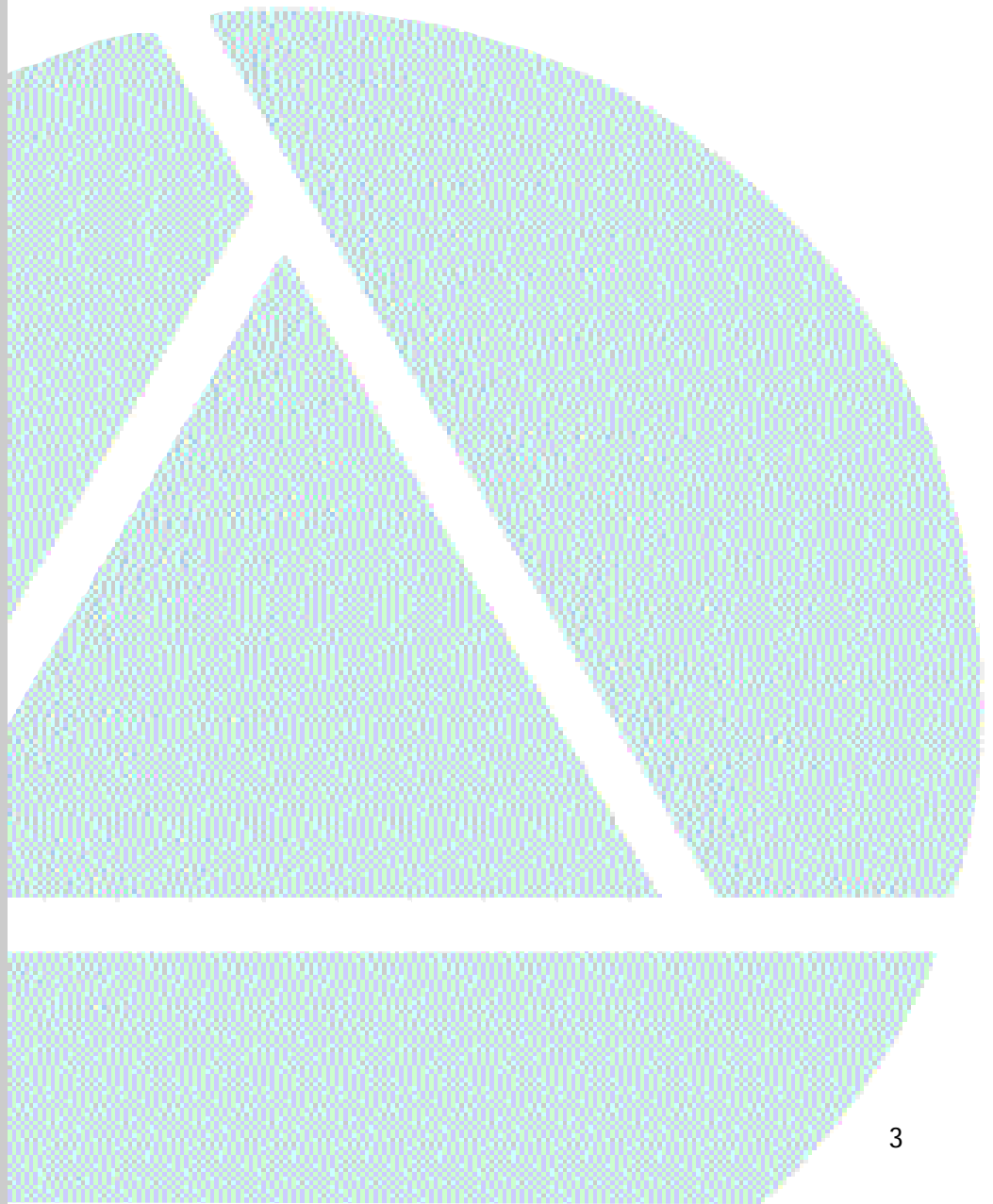
I greatly appreciate the full cooperation we have received from all those individuals we dealt with in municipal, provincial and federal government organizations and the private sector throughout the course of this audit.

George L. Morfitt, FCA
Auditor General

Victoria, British Columbia
November 1997



earthquake preparedness: summary



earthquake preparedness: summary

An audit of how well prepared for a major earthquake the provincial government and local governments are in British Columbia

Southwestern British Columbia lies over the active Cascadia subduction zone in an earthquake environment comparable to that existing along the coasts of Japan, Alaska, and Central and South America. There is considerable earthquake activity along the fault lines of three plates lying to the west of the North American continent.

The stresses that arise along the fault lines between the North American and Juan de Fuca plates are considerable. Records show that major damaging earthquakes have occurred over this zone in 8 of the last 125 years, and that a catastrophic earthquake is likely once every 300 to 800 years. In recent years, earthquakes exceeding 7 on the Richter scale have been recorded in British Columbia.

Given this hazard, it is incumbent upon governments to take steps to prepare for a major earthquake. In British Columbia, local governments are the first responders, with the provincial government and, ultimately, the federal government providing assistance as required. However, it is the provincial government that has an overall leadership and coordination role in emergency management, and it has assigned responsibility for this role to the Provincial Emergency Program, an agency within the Ministry of Attorney General.

Audit Purpose and Scope

The purpose of the audit was twofold: to assess the degree to which governments in British Columbia are prepared for a major earthquake in high hazard areas of the Province; and to determine what actions, if any, are needed to raise the level of preparedness to an adequate standard.

Our audit focused on the critical elements of earthquake preparedness. These are:

- understanding the hazards, risks and vulnerabilities;
- mitigating the potential impacts of a major earthquake;
- planning for response to a major earthquake; and
- planning for recovery from a major earthquake.

Specifically, we were interested in examining how well all of these elements are being handled by the provincial government and local governments (although one important segment of the work examined the relationship between the provincial and federal governments in emergency planning). This included examining the governments' roles in mitigating the potential impacts of a major earthquake through, for example, the appropriate design and enforcement of building codes and the fostering of public awareness. We also studied the extent to which current, tested plans are in place to respond in the immediate aftermath of a major earthquake. As well, we looked at the capability of governments to carry on providing essential services to the public through proper continuation and recovery plans. Our examination focused on the plans and procedures in place during the period April to July 1997.

Finally, although it was not part of the audit, we also carried out a limited review of the "Blizzard of '96" to determine which features of the emergency management system did and did not work well, and to assess the implications of this for earthquake preparedness in the Province.

Overall Conclusion

We have concluded that governments in British Columbia are not adequately prepared for a major earthquake. However, we were impressed by the amount of earthquake planning that has taken place in recent years. The federal government, agencies such as the Provincial Emergency Program, and emergency planning officials in many local government organizations have been working hard to further the preparedness of the Province for such an event.

The provincial government and local governments are, in a general sense, aware of the hazards, risks and vulnerabilities associated with a major earthquake. However, they are likely to experience difficulty (albeit to varying degrees) in planning mitigation, response and recovery programs effectively because they have not yet developed specific, comprehensive scenarios for all high hazard, high risk areas of the Province. Through these scenarios, governments would be able to assess the likely impacts of a major earthquake on citizens, critical facilities, lifelines and economies—information that would better focus planning and public awareness programs.

Governments also have a general understanding of the importance of mitigation. However, it is unclear whether resources invested by provincial and municipal governments to upgrade infrastructure (such as bridges and dams) are

being targeted to the highest priorities because a coordinated approach and a long-term strategy have not been developed. Furthermore, there is no assurance that all critical response facilities (such as fire and ambulance halls, and police stations) will remain operational after an earthquake, or that damage to hazardous buildings will not cause avoidable injury or death. Public apathy about preparing for an earthquake remains high, despite a number of public awareness programs having been implemented.

It is unlikely that all key aspects of the provincial government's response efforts for a major earthquake will work as intended. The Provincial Emergency Program and most provincial government organizations have developed response plans that deal with key response functions, and some testing of those plans has been carried out. However, the overall provincial response plan, while sound in concept, is still in interim form after five years, and needs updating and finalizing. Some provincial government response functions, such as emergency social services, appear well prepared; others, such as the medical and heavy urban search and rescue functions, do not.

We believe that local governments are not yet adequately prepared to respond. The quality of local government earthquake planning varies widely. Some jurisdictions have taken the earthquake threat very seriously and are continuing to improve their response plans. Other jurisdictions have given less attention to developing sound plans. Nearly 20% of the local governments who answered our survey reported that there was no earthquake preparedness plan in their jurisdiction.

At all levels, testing of response plans is insufficient, and there are indications that more training is required. The ability of responders to communicate with each other and with different levels of government continues to be a concern, although steps are being taken to improve the situation.

Neither the provincial nor local governments are prepared to manage the recovery that will be necessary after a major earthquake. Business continuation planning—critical to effective short-term recovery—is almost non-existent at the provincial level. It is also generally lacking at the local level, although some municipalities are currently developing such plans. Procedures for inspecting and posting unsafe buildings do not exist, and little thought has been given to how the debris resulting from a major earthquake would be dealt with. Also, few governments have plans for expediting the repairs and rebuilding that would be necessary, and none has analyzed the financial options for funding a rebuilding program.

Key Findings

Detailed analysis of the likely impacts of a major earthquake is required

The provincial government and local governments are, in a general sense, aware of the hazards, risks and vulnerabilities associated with a major earthquake. What they have not yet done, however, is develop specific, comprehensive scenarios for all high hazard, high risk areas of the Province to assess the likely impacts of a major earthquake on their citizens, critical facilities, lifelines and economies—information that would better focus planning and public awareness programs.

Some worthwhile scenario work has been undertaken for Lower Mainland communities within the last five years, but it was not intended to cover all of the critical components that scenarios generally include, such as potential damage to hospitals and schools. Overall, therefore, local governments and government organizations are likely to experience difficulty, albeit to varying degrees, in planning mitigation, response and recovery programs effectively.

Retrofitting is not well coordinated

In recent years, work has been undertaken at significant cost to upgrade the provincial and municipal infrastructure. We view this effort positively, but note that there has not been a coordinated approach to the effort. As a result, it is unclear whether resources are being invested in a way that reflects the highest priorities. Furthermore, it is unclear whether all critical response facilities will remain operational after an earthquake, or that damage to hazardous buildings will not cause avoidable injury or death, because there has not been an organized approach to assessing these structures and, where appropriate, strengthening them.

Public apathy about earthquake preparedness remains high

The consistent view of those to whom we spoke was that the public is generally apathetic about the risks of a major earthquake and is therefore not well prepared, despite the myriad public awareness programs delivered by all levels of government and several private sector organizations. This suggests the need for a new communications strategy.



Courtesy: Office of Emergency Services, State of California

Extensive earthquake damage to infrastructure

The role of insurance is not clear, and there are questions about insurance capacity

The government has not developed an overall strategy for mitigation, and therefore has not clearly defined the role that insurance can and should play as a means of mitigating the financial impacts of an earthquake. Further, the government has not evaluated the most desirable balance of public and private sector involvement in offering affordable earthquake insurance to the public. And although discussions are taking place with representatives of the insurance industry on matters such as its capacity to meet all potential earthquake-related claims, there is still some way to go before these issues are resolved.

The provincial response plans need updating and finalizing

The British Columbia Earthquake Response Plan appears sound in concept. However, five years after its issue, the plan is still in interim form and some of the supporting ministry plans are incomplete or have not been adequately tested. Moreover, some of the assumptions on which it is based—such as the ability of all government ministries to carry out assigned response functions—may not be realistic.



Courtesy: Office of Emergency Services, State of California

Emergency workers surveying earthquake damage

Plans for the provision of emergency social services are well developed

We found that the emergency social services (ESS) plans adequately address assigned responsibilities, and are tested to an appropriate degree. The ESS function—the responsibility of the Ministry of Human Resources—is designed to handle a wide range of personal services after an emergency, such as counselling, greeting evacuees and providing support to dependent individuals, as well as providing clothing, shelter and food to responders and evacuees. It provides support and advice to municipalities on matters such as setting up emergency reception centres, and it trains and assists municipal ESS personnel.

The ability of the health care sector to respond is of concern

Of the key support functions, medical—the responsibility assigned to the Ministry of Health—is the one of most concern to us. There is not a system-wide plan for emergency preparation and response. This is particularly worrisome, as those hospitals who responded to our survey expressed a pessimistic view of their ability to provide adequate out-patient and care services after an earthquake.

Local government plans provide inadequate guidance

Overall, we found the earthquake response planning done by local governments to be inadequate, although the quality of the planning varies widely. Some jurisdictions have taken the earthquake threat very seriously and are continuing to improve their response plans. Other jurisdictions have given less attention to developing sound, viable plans. Nearly 20% of local government respondents reported that there was no emergency plan in their jurisdiction. We think this should be a matter of concern to the provincial government. (Our view of local government planning was supported by our survey respondents, the majority of whom concluded that their respective local governments had not made adequate preparations for a major earthquake. And, almost 50% believe their local government does not have the capacity to respond effectively to such an event.)

Implementation of the British Columbia Emergency Response Management System is a good step

We strongly support the initiative to implement the British Columbia Emergency Response Management System for use in earthquake preparedness (as well as other emergencies). The system has the potential to provide the many different response agencies with a commonly understood command structure. It incorporates the Incident Command System used in many parts of the United States. This is a flexible structure designed to be followed in the handling of both minor accidents and major emergencies involving multiple jurisdictions and agencies. This should minimize confusion and duplication of effort.

National support plans are generally comprehensive and practical

There are comprehensive and practical arrangements with the federal government and the government of Alberta, to support the Province's response efforts in the event of a catastrophic earthquake. (As we did not have any authority to examine the completeness or currency of detailed federal departmental plans, we must qualify this conclusion somewhat.)

More plan testing and follow-up of tests is needed

Testing in recent years of the Province's response plans and their interface with the federal government's plans has shown that the plans appear viable. It has also demonstrated the benefit of such tests by identifying a number of issues that need resolving. However, many of the resulting recommendations

have not yet been acted on. At the individual local government level, we found plan testing to be inadequate to provide assurance that a response to a major earthquake will be effective. Priority should be given at all levels to more frequent testing.

The extent of training is inadequate

The nature of training offered both provincially and federally is good, but we have concerns about its extent. The major tests held since 1993 have identified as a problem the insufficient training of ministry personnel who would be called upon to staff Provincial Field Response Centres and make decisions about ministry plans and resource use in the event of an earthquake. The need for similar personnel at the local government level to be adequately trained is self-evident, yet there are indications that these front-line staff may also not be receiving required training.

Processes for damage assessment are inadequate

There is currently a lack of clarity about how initial damage assessment will be carried out, and by whom. As a result, were a major earthquake to occur tomorrow, damage assessment would likely be slow and uncoordinated in the early stages after the earthquake, and inconsistently carried out by the local and provincial authorities.

Communications systems need better coordination

The ability of responders to communicate with each other and with different levels of government is a concern. Testing has concluded that the current emergency radio communications resources available to the Province cannot effectively support a coordinated response effort to a major earthquake or, indeed, any other serious emergency that causes telephone service to be disrupted for a significant time. Governments are aware of this problem and some significant steps are being taken to deal with it, in particular the building of a regional communications centre in Vancouver to serve southwestern British Columbia.

Public information and warning systems are not well developed

Plans for issuing warnings to the public and for keeping the public informed after an earthquake are not well developed. An interim British Columbia Emergency Public Information Plan was prepared in 1994, but it has not been finalized or updated to reflect current circumstances. And, only a minority of local governments and police forces felt that they had the

capacity to provide accurate, timely and useful information during an emergency period. This could result in uncertainty and confusion in the minds of the public. In particular, prerecorded messages are rarely developed and multilingual messages for use after an earthquake are virtually non-existent. Given the ethnic diversity of the province's population, the latter is a serious limitation.

There is very little business continuation planning for governments

Business continuation planning—important to governments' ability to continue to provide essential services in the aftermath of a major earthquake—is almost non-existent at the provincial government level. It is also generally lacking at the local government level, although some municipalities are currently developing such plans.

Ability to inspect and post the state of unsafe buildings is inadequate

We found no organized, coordinated, province-wide approach to the inspection and posting of buildings in British Columbia. Few guidelines are in place and, particularly at the local government level, it seems unlikely that sufficient qualified personnel would be available to complete the task in a satisfactory way. This could result in unsafe buildings being accessed by the public after an earthquake, thereby possibly causing injury or loss of life.

Little planning for debris removal

Very little thought has been given to the post-earthquake removal of debris. Most local governments do not have plans to coordinate debris removal. Of those that do, few have identified potential sites to which to move debris. As a result, emergency vehicles could be impeded, and other recovery activities slowed down unnecessarily.

Factors Influencing the State of Earthquake Preparedness in British Columbia

In addition to assessing the state of earthquake preparedness, we considered the general environment in which earthquake preparedness activities have been carried out. We concluded that there are a number of factors that have influenced in a general way the state of earthquake preparedness in the Province.

- British Columbia has not yet experienced a major earthquake in a heavily populated area, such as those that have caused significant damage in other parts of the world. As a result,

while there is clearly some political will to achieve an adequate level of preparedness, the threat of an earthquake is generally not seen to be sufficiently real or imminent to make preparedness a matter of political priority.

- British Columbia is relatively new to the field of earthquake preparedness. Although it has had various forms of civil defence planning over the last 40 years, it is really only since the 1980s—with the growing understanding of the risk—that serious consideration has been given to preparing for a major earthquake. Most of the effort to date has gone into planning for response; planning and establishing mitigation and recovery programs have been slower to develop.
- Strategic planning—setting long-term goals and objectives, and implementing a plan designed to achieve them—has not been carried out. In part, this reflects the lack of consistent interest and commitment shown by politicians and senior management. Those individuals involved in earthquake preparedness in the Province, though dedicated and enthusiastic, have had limited success in gaining the attention and support of senior management. We believe this is one of the reasons that some emergency plans are neither current nor tested, and that even when tests are carried out, it has been difficult to get the involvement of those who would actually be called upon to make decisions in the event of a major earthquake. Lack of strategic direction reduces the likelihood of a consistent effort toward mitigation and recovery activities. Tangible progress in improving overall preparedness is only likely to happen if it responds to an explicit statement of what government wants to achieve.
- The absence of specific and comprehensive earthquake planning scenarios has reduced the incentive to plan effectively. Such scenarios can be powerful tools in: helping elected officials visualize the threat and commit themselves to leadership in mitigating the hazard and planning for response; helping provincial and local government officials focus their decision-making for emergency planning; helping private sector managers understand the scope of the hazard and consider it in their business decisions process; helping educators and journalists ensure that the public is correctly informed about the character of the threat and the importance of being prepared to mitigate its effects; and helping the general public appreciate the extent of their vulnerability, and support public mitigation efforts and develop personal strategies for earthquake preparedness.



Courtesy: Office of Emergency Services, State of California

Damage to building masonry

- The positioning of the Provincial Emergency Program (PEP) in government does not give it a sufficient profile to be effective. Many people we spoke with felt that PEP’s relatively minor position within the Ministry of Attorney General signifies the degree of importance placed on the program by the provincial government. We agree that this issue does appear to have affected PEP’s ability to influence others to do what needs to be done.
- PEP has not had the resources to carry out many of the tasks its staff know should be done. In its headquarters in Victoria, it has two planners, one of whom spends a considerable part of his time on earthquake preparedness. Around the Province it has six regional offices, each staffed with just one professional and one administrative assistant (apart from the southwestern region, which has two full-time professionals and one full-time and one half-time administrative assistant) who must deal with all aspects of disaster management in the Province, not just earthquake preparedness. This means that much of staff’s time is taken up handling day-to-day crises.

- No agency has been charged with the responsibility of monitoring compliance with the *Emergency Program Act* and associated regulations. Nor has any agency been given the responsibility of monitoring the overall state of earthquake preparedness in the Province. As a result, government may not have had full information to support its policy decisions regarding the direction and funding of emergency preparedness activities.
- The Inter-Agency Emergency Preparedness Council—established by legislation to facilitate the coordination of ministry and Crown corporation emergency planning and procedures—has not been as effective as it could have been, although it does have some positive achievements to its credit (for example, introducing the British Columbia Emergency Response Management System). A number of factors have imposed serious limitations on the Council’s effectiveness: the composition of the Council has changed frequently; attendance of some members has been inconsistent; and it is questionable whether some of the members have been sufficiently empowered to commit their organizations to actions approved by the Council. Also, there has been no body overseeing the activities of the Council, and thus no one to encourage participation and remove any impediments to progress.
- The need for regional coordination has not been given sufficient emphasis. Existing legislation enables regional districts to assume emergency planning responsibility for a region, but only where the member jurisdictions want this shift to take place. Where this has not happened, regional coordination depends on voluntary participation of municipalities.

The provincial government clearly has an interest in the overall success of regional planning initiatives, but this interest has not been articulated either in existing legislation or in any other formal way. Nor has a way been set out for the provincial government to ensure that lack of consensus and non-participation do not jeopardize a region’s ability to deal with key emergency planning issues.

Recommendations

Based on our analysis of the factors influencing the state of earthquake preparedness in British Columbia, we believe there are nine major—strategic—recommendations that transcend all the others. Implementing these high-level actions would, in our opinion, provide the leadership and environment necessary to enable significant improvement in the state of preparedness.

These recommendations focus mostly on the provincial government's role in providing a solid foundation for earthquake planning and management in the Province. Among other things, this role involves providing appropriate direction, creating and supporting the agencies needed to effect change, and monitoring and reporting progress made toward desired levels of preparedness.

Following the nine strategic recommendations are a number of more operational recommendations.

Strategic Recommendations

1. The provincial government should establish a Seismic Safety Commission

Bringing together the experts scattered throughout the Province, the commission would review relevant scientific and other information from British Columbia and elsewhere, provide advice to all stakeholders, and make specific policy recommendations to the minister responsible (the Attorney General) with respect to enhancing:

- earthquake planning scenarios;
- public awareness programs;
- mitigation programs;
- response capabilities; and
- strategies for recovery.

2. The provincial government should develop long-term goals for earthquake preparedness

Achieving an adequate state of preparedness for an earthquake is a long-term endeavour; the provincial government should have a clear sense of where it would like the Province to be in its earthquake preparedness state after the next 5, 10 and 15 years have elapsed, and even longer. We believe the provincial government needs to establish specific and measurable long-term goals on which to focus its earthquake preparedness activities. To be of practical value, these goals should be established in the areas of mitigation, planning for response, and recovery. For each of these goals, substantive and measurable objectives must also be set.

It is not enough that goals merely be set. There also has to be a plan to achieve the goals, a specific timetable for carrying out the plan, and an accurate process for measuring the extent to which progress is being made toward achieving the goals. Such a process would require more intensive monitoring by PEP of, for example, the adequacy of municipal plans and the extent to which important activities such as plan testing and exercising have been carried out.

3. *The provincial government should provide more focus to its earthquake preparedness program*

We believe that the provincial government needs to clarify the scope of its earthquake preparedness program if it is to reach the long-term goals for earthquake preparedness we have recommended be set.

Among the objectives of the earthquake program should be to:

- develop a provincial resource and information system to support preparedness activities;
- evaluate, adapt and disseminate existing information from the United States and other sources;
- develop and disseminate guidelines and methodologies for earthquake hazard mitigation and post-earthquake recovery and reconstruction planning;
- provide appropriate technical assistance to local officials to improve their preparedness, response, and recovery capabilities, as well as hazard mitigation efforts;
- participate in a broad spectrum of public education and information efforts to increase public awareness of earthquake hazards, and to improve public understanding of the need for preparedness and mitigation;
- promote programs to encourage individual, family, institutional and business preparedness and mitigation, coordinated with other governmental preparedness and mitigation efforts; and
- encourage the effective use of all resources available to the Province to develop comprehensive and integrated approaches to preparedness.

We believe that the earthquake program should continue to be under the direction and control of PEP, which would be responsible for its proper design and implementation, and be accountable for its results (but see recommendation 5).

4. *The Provincial Emergency Program, regional and local governments should extend the development of earthquake planning scenarios*

PEP should work with regional and local governments to refine the development of specific, regional earthquake planning scenarios and to extend their application to all communities within the high hazard, high risk areas of the Province. We believe the development of these scenarios is critical if the level of earthquake preparedness is to evolve beyond its present state.

These scenarios would articulate in some detail the hazards, risks and the potential impacts of a major earthquake on citizens,

critical facilities (such as hospitals, schools and highways), lifelines and economies. This information could then be used by planners to better decide the nature and extent of mitigation necessary, the specific risks that need to be planned for, and the extent of recovery planning that is appropriate. And, just as importantly, this information could help to focus elected officials on the real risks for those living in their constituencies.

5. *The provincial government should reposition the Provincial Emergency Program*

In view of PEP's difficulty in providing effective leadership for earthquake planning, we believe that the repositioning of the agency is a matter requiring the government's immediate attention. Dealing with this matter now rather than later will also be seen as a clear statement of the importance that government attaches to earthquake preparedness, and of its commitment to improving that preparedness.

6. *The provincial government should increase funding for the Provincial Emergency Program*

Many of the recommendations that we have made call for a more active role for PEP. The provincial government should provide PEP with sufficient resources to meet the government's expectations for corrective actions. Specifically, we believe that resources should be made available to PEP to allow it to recruit the sort of expertise necessary to carry out the functions we identified in recommendation 3. We also believe that PEP should be provided additional resources to allow it to work more closely with local governments.

7. *The Provincial Emergency Program should report annually on the state of earthquake preparedness in British Columbia*

We believe that PEP should publish an annual report on the state of earthquake preparedness in British Columbia. The report, to be completed within 90 days of the end of each fiscal year, should be from PEP to the Attorney General, who in turn should table it in the Legislative Assembly. The report should include:

- an assessment of the overall state of earthquake preparedness of the Province;
- the status of recommendations made by the Seismic Safety Commission (see recommendation 1, above);
- a report on the plans and achievements of the Inter-Agency Emergency Preparedness Council; and
- accountability information regarding PEP's own performance in relation to its annual objectives.

8. The provincial government should raise the profile of the Inter-Agency Emergency Preparedness Council

Deputy ministers and Crown corporation chief executives should take steps to increase the profile and effectiveness of the Inter-Agency Emergency Preparedness Council. First, they should ensure that their representatives to the Council are empowered to commit their organization to supporting and acting on Council initiatives. Second, they should, through their own councils, monitor the operations of the Council and make sure that any lack of participation or consensus is not allowed to impede its work.

9. The provincial government should strengthen regional emergency planning and coordination

The provincial government should establish a framework that requires regional planning and coordination to occur, and should specify the results to be obtained. And the government’s role and interest in regional planning and coordination should be formalized through amendments to legislation to allow the minister to intervene in certain circumstances. This is not a new concept for the provincial government; in other community-focused legislation, it has clearly indicated its willingness to intervene in the public good in cases where consensus cannot be found. An alternative approach is to define the minister’s role through prior agreement with all parties.

Operational Recommendations

In the detailed report, we made a number of specific recommendations, some directed to the provincial government and some to local governments. These recommendations are summarized here and classified according to which level of government is responsible for their implementation.

Recommendations to the Provincial Government

Mitigation

The provincial government should:

- 10.** ensure that the seismic elements of the Provincial Building Code are applied to all provincial buildings;
- 11.** maintain an advisory capability to help municipalities work with the Provincial Building Code;
- 12.** determine the role that insurance should play in mitigation, and define the most appropriate regime through which it can be offered to the public; and

- 13.** continue discussions with the insurance industry and, where appropriate, the federal government with a view to reaching agreement on how best to create an environment for an affordable insurance regime within the industry's capacity.

PEP should:

- 14.** measure the extent of public preparedness (this should be done now, to help decide how and where to focus public awareness activities and to provide a baseline for future measurement and, at regular intervals in the future, to help assess the effectiveness of the initiatives);
- 15.** work with key stakeholders (such as Emergency Preparedness Canada, provincial government agencies, local governments, utilities and private sector organizations) to develop and implement a coordinated public awareness communication strategy; and
- 16.** in conjunction with the development of earthquake planning scenarios (see strategic recommendation 2 above), develop an inventory of key provincial infrastructure. Based on the detailed vulnerability analysis the planning scenarios would provide, options for dealing with areas of vulnerability should be considered, the cost of upgrading estimated, and programs proposed to carry out the upgrades on a priority basis over, for example, the next 20 years.

Planning for Response

- 17.** The Ministry of Health and PEP should give immediate attention to reviewing and, where appropriate, strengthening the ability of the health system to respond to a major earthquake.
- 18.** All ministries assigned key support functions should complete, without delay, plans detailing how they will carry out their assigned responsibilities after a major earthquake.
- 19.** The Ministry of Environment, Lands and Parks should develop a response plan, test it and train staff accordingly, in order to be able to meet its responsibilities under the provincial earthquake response plan.

PEP should:

- 20.** update the British Columbia Earthquake Response Plan to reflect the current situation, and take steps to have the *Emergency Program Management Regulation* amended as necessary;

- 21.** develop a new communication strategy to ensure that the provincial response plan is known and understood by local authorities and response agencies;
- 22.** take a stronger, more proactive role than it is now doing, to ensure that supporting ministries keep their earthquake preparedness plans current;
- 23.** continue to work with Emergency Preparedness Canada at the national level to develop further heavy urban search and rescue capability;
- 24.** take a leadership role with respect to the development of systems standards, protocols, guidelines and coordination for resource management;
- 25.** identify a number of potential Provincial Field Response Centre sites at strategic locations throughout the Province, test them for suitability, and communicate the details to those agencies likely to be involved in the response efforts;
- 26.** take steps to identify, equip and test an alternative site for its Provincial Emergency Coordination Centre;
- 27.** play a stronger role in providing to local governments advice and assistance regarding response planning, and in monitoring to ensure that all municipalities plan to a certain standard;
- 28.** review on a regular basis with Emergency Preparedness Canada the status of the National Earthquake Support Plan. As well, the *Canada-British Columbia Memorandum of Understanding on Emergency Preparedness* should be reviewed and, where appropriate, updated.
- 29.** continue to work with its counterparts in Alberta to ensure that the Alberta Support Plan is operational for a real event;
- 30.** remain in contact with the Canadian Forces to ensure that it has current information about the resources and capabilities available, and disseminate this information to municipalities;
- 31.** discuss with Emergency Preparedness Canada the possibility of conducting regular exercises around the National Earthquake Support Plan and its relationship to British Columbia's plans;
- 32.** develop provincial initiatives to encourage municipalities to test key components of their individual plans sufficiently, and to provide more exercises at the province-wide and regional levels to ensure that the liaison between

the emergency response efforts of different levels of government works effectively;

- 33.** prepare a matrix of emergency planning and response positions at both provincial and local government levels, and identify the appropriate training regime needed for each position;
- 34.** obtain from provincial and local government agencies, at least annually, information about the training they have provided to emergency planning and response personnel;
- 35.** develop a clear and practical plan setting out roles, responsibilities and processes for carrying out initial damage assessment immediately following a major earthquake, and communicate the plan to all who will have a role in damage assessment;
- 36.** develop a coordinated plan for upgrading the province's communication equipment to a more reliable system, and update, finalize and distribute its communications plan; and
- 37.** develop and issue a current emergency public information plan as soon as possible, and test the plan on a regular basis.

Planning for Recovery

The provincial government should:

- 38.** implement the recommendations made by the Risk Management Branch regarding business continuation planning. These recommendations include: assigning responsibility for maintaining a business continuation planning program and establishing accountability for success; monitoring the status of such planning; and auditing ministry planning programs. Also recommended was that the Risk Management Branch act in a training and coordinating role and provide status reports to the Deputy Ministers' Council.
- 39.** give serious consideration to how best to coordinate the roles of the Risk Management Branch and PEP, as this area of emergency preparedness is closely related to the other aspects of preparedness for which PEP is responsible; and
- 40.** discuss with the federal government options for dealing with the financial ramifications of a catastrophic disaster. In addition, it should develop its own options paper on ways of dealing with and mitigating its own financial liabilities in the event of a major earthquake.

41. Ministries and Crown corporations should give immediate attention to completing business continuation plans.

PEP should:

42. establish and provide to local governments guidelines for the development of business continuation plans;

43. pursue the recommendations made in an interim report of the Joint Emergency Liaison Committee regarding structural assessment. These recommendations include:

- assigning volunteer engineers to pre-designated fire halls;
- providing accessible storage of necessary equipment and supplies at pre-designated fire halls;
- identifying volunteer engineers and registering them with PEP;
- having PEP coordinate the registration of all types of volunteers prior to a disaster; and
- having PEP develop an education strategy for professionals and the public to inform them about building inspection and posting.

44. advise local governments as to the steps they should take to develop sound plans to inspect and post buildings after an earthquake (helpful in this regard—particularly in establishing priorities for post-earthquake inspections—will be the inventories of hazardous buildings and critical response facilities suggested in recommendations 50 and 51, below);

45. working in conjunction with local governments, ensure that plans are developed to inspect all key infrastructure (whether it be owned provincially or locally);

46. establish and provide to local governments guidelines for dealing with debris removal; and

47. establish and provide to local governments guidelines for planning for reconstruction.

Recommendations to Local Governments

We recognize that not all of the recommendations set out below will be applicable to every local government, although we suggest that each such government use this list as a checklist to see where its own earthquake preparedness could be improved.

Some of the recommendations require local governments to seek assistance from PEP, if they are to be economically, efficiently and effectively implemented. Where this is the case, the relevant recommendation to PEP is included under “Recommendations to the provincial government,” above.

Although the scope of our evidence gathering was limited to the areas in the Province where earthquakes were most likely to occur and to cause the most damage, we believe our recommendations are applicable to all local governments across British Columbia.

Mitigation

Local governments should:

- 48.** take steps to apply the seismic elements of the building code to all new critical response facilities;
- 49.** in conjunction with the development of earthquake planning scenarios (see strategic recommendation 4 above), develop an inventory of key infrastructure. Based on the detailed vulnerability analysis the planning scenarios would provide, options for dealing with areas of vulnerability should be considered, the cost of upgrading estimated, and programs proposed to carry out the upgrades on a priority basis over, for example, the next 20 years;
- 50.** develop programs to identify and inventory hazardous buildings and to upgrade the seismic robustness of buildings based on the relative magnitude of risk to the public; and
- 51.** assess all critical response facilities, estimate the cost of upgrading them to a standard that would ensure their operability in a post-earthquake situation, and establish priorities for upgrading.

Planning for Response

Local governments should:

- 52.** ensure they have current, complete earthquake preparedness plans, prepared in accordance with guidelines issued by PEP;
- 53.** develop schedules for testing their plans and ensuring that recommendations arising from the tests are dealt with;
- 54.** develop plans for carrying out initial damage assessment immediately following a major earthquake, and ensure the plans are consistent with the provincial plan;

- 55. continue to test their ability to communicate with each other and, where significant problems are identified, take steps to correct the problems; and
- 56. develop emergency public information plans, and test them on a regular basis.

Planning for Recovery

Local governments should:

- 57. give immediate attention to completing business continuation plans;
- 58. working in conjunction with PEP, ensure that plans are developed to inspect all key infrastructure (whether it be owned provincially or locally);
- 59. develop plans for debris removal; and
- 60. establish strategies for long-term reconstruction.

In What Order Should the Provincial Government Implement the Recommendations?

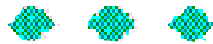
Our recommendations for the provincial government, although diverse, are all linked to some degree. Some are prerequisites of others. Some can be implemented within a short period of time, while others may require a number of years to bring about fully.

Our strategic recommendations provide an essential foundation for specific elements of earthquake planning and management. Because of this, we believe that these recommendations should receive the provincial government's immediate attention.

In particular, clarifying the government's **expectations for achievable states of medium and long-term preparedness** is needed to set up an framework for overall planning and management, and to establish the measures against which the government should be **publishing its report on the state of provincial preparedness. Establishing a seismic safety commission, developing an earthquake program, and providing the necessary resources** are key initial steps in translating these expectations into an action plan. At the same time, **preparing regional earthquake scenarios** allows the action plan to focus on the areas of most risk.

Most of the operational recommendations, particularly those for mitigation and recovery, logically follow the implementation of the above, particularly as policy issues may be involved. However, certain of the recommendations relating to response require immediate attention. The government's own **earthquake response plans should be updated, finalized and distributed** immediately. **Business continuation planning** needs to be given priority, and the provincial government should work with local governments to ensure that **critical response facilities are assessed** and, where necessary, **upgraded** to current standards. As well, the **ability of the health system to respond to a major disaster needs to be evaluated** in detail, and appropriate remedial actions taken. The **extent of earthquake plan testing province-wide** needs to be expanded, and steps should also be taken to **upgrade the training of government employees likely to staff the Provincial Field Response Centres** as soon as possible.

There are other operational recommendations that could be implemented immediately, and we encourage the government to do so. However, we believe that starting work on the issues that we have described above should have first claim on available resources.



attorney general's response

November 20, 1997

George L. Morfitt, FCA
Auditor General
Office of the Auditor General
2nd Floor, 8 Bastion Square
Victoria, British Columbia
V8V 1X4

Dear George Morfitt:

In January, I requested an independent review of British Columbia's emergency preparedness. I am now pleased to receive the Office of the Auditor General's Performance Audit Report on the state of earthquake preparedness of British Columbia's provincial and local governments. The province's ability to cope with a major earthquake is a good indication of our ability to cope with any emergency situation that may occur.

The comprehensive report reflects the critical importance of this issue. It is my belief that this type of audit is essential to assess government's performance, identify areas that need improvement and, by way of its recommendations, outline action that needs to be taken at all levels of government to better prepare for, respond to, and recover from a major earthquake.

At the same time, your recommendations acknowledge that "achieving an adequate state of preparedness is a big task that will not be completed overnight."

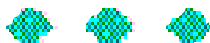
While it is clear that we must take more action, I am pleased by the recognition given to the Provincial Emergency Program for the progress made in the past few years, particularly in the areas of earthquake preparation and response planning.

The ministry looks forward to carefully reviewing the recommendations with other provincial ministries and municipalities to work out a detailed action plan.

The information contained in this report is invaluable, and will form the basis for discussion and the development of a coordinated approach and long-term strategy that reflects the commitment and continued support of all levels of government.

Yours sincerely,

Ujjal Dosanjh
Attorney General



Compiled and typeset by the Office of the Auditor General of British Columbia
and published by the Queen's Printer for British Columbia®
Victoria 1997

