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*Emergency Management  
Work Plan  
FY 1991-92  
(Earthquake Preparedness)*

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November 1991

Planning and Development  
Department

**METRO**

Attachment "A" to  
Resolution No. 91-1528  
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Metropolitan Service District  
November 26, 1991

Metropolitan Service District  
2000 S.W. First Avenue  
Portland, OR 97201-5398  
(503) 221-1646

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Metro Council

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Planning and Development Department

Richard Carson, Director

This report researched and written by:

Becky Crockett  
Urban Services Supervisor  
Planning and Development Department

## I. Purpose

The purpose of the Emergency Management Work Plan in FY 1991-92 is to initiate a regional earthquake planning effort with a focus on mitigation. This "prior-to" planning will involve:

- 1) working with the Department of Geology and Mineral Industries (DOGAMI) to develop a seismic hazard database utilizing Metro's Regional Land Information System (RLIS) capabilities;
- 2) assessing seismic risks at Metro facilities;
- 3) continued involvement in developing a regional seismic hazard needs assessment;
- 4) researching program funding alternatives;
- 5) establishing Metro's role in regional emergency management;
- and 6) strengthening the roles of local government officials, local emergency planners and local land use planners in mitigating the impacts of an earthquake.

The work tasks identified in this program focus on preparing the region for a major earthquake. Work to date on this project indicates that developing a regional earthquake preparedness plan is a monumental endeavor. Little effort has been put forth in the past, but the recent documentation by scientists indicates this region may be subject to serious seismic activity. This potential seismic threat coupled with the lack of effort in preparedness, could result in major devastation in terms of human life and to the economic stability of the region. The importance of a regional effort in bringing necessary entities (local governments, state agencies, universities, utilities, Metro, the Red Cross, the Army Corps of Engineers) together to work in concert toward the common goal of regional earthquake preparedness cannot be overstated. The issue is big, the threat is real, the work to date is inadequate and resources are scarce. Therefore, of primary importance is the need to tap into outside resources to achieve this goal.

## II. Background

### Earthquake Threat

Recent geologic and seismologic studies indicate that the Pacific Northwest may be subjected to a significant level of seismic hazard in contrast to what has been experienced in historic times. This is particularly true for the Portland metropolitan area, which has had only two damaging earthquakes, a magnitude 5+ in October 1877 and a magnitude 5.1 on November 5, 1962.

Potential sources of strong earthquake ground shaking in the Pacific Northwest include: 1) the possible occurrence of a great earthquake (magnitude  $\geq 8$ ) occurring along the Cascadia subduction zone; 2) a relatively deep intraplate event occurring within the subducted Juan de Fuca plate similar to the 1949 Olympia (magnitude 7.1) and the 1965 Seattle-Tacoma (magnitude 6.5) earthquakes; and 3) a shallow crustal earthquake in the North American plate such as the 1872 North Cascades (magnitude 7.3) and the 1877 and 1962 Portland earthquakes.

If one assumes that the existing historical record (covering only 150 years in the Pacific Northwest) of earthquake activity is indicative of seismic hazards, then one should expect only moderately severe earthquakes will occur in the future. Recently, however, the Juan de Fuca subduction zone, located offshore of Oregon and Washington, was compared to other subduction zones around the world. The Juan de Fuca Plate, which underlies the northeastern Pacific Ocean, is being underthrust, or subducted, beneath the North American continental margin. The Cascade volcanoes are one consequence of this subduction process. At all other active subduction zones in the world, very large destructive earthquakes (magnitude 8.0 or greater) usually accompany subduction. Scientific evidence on the Oregon and Washington coast now indicate that subduction events have occurred in the past at a recurrence interval of 400 to 550 years. The research further suggests that the last major earthquake (greater than magnitude 8.0) occurred about 300 years ago or sometime in the late 1600s. Based on this information, scientists estimate that there is a 20 percent probability that a large subduction zone earthquake can occur in the next 50 years in the Pacific Northwest.

In view of the scientific evidence, it is imperative that the region move forward in taking actions to prepare for these earthquake hazards. Community lifelines and critical structures need to have protection plans. There is a need to protect the infrastructure over the long run by integrating seismic safety provisions into building and land use plans. The public needs to be educated about earthquake hazards and how to insure their safety during a seismic event. Long-term economic impacts of a large earthquake can destroy communities more thoroughly than the initial physical devastation. If we are lucky, we may have a few decades to prepare. We should not squander this opportunity. This work program represents the initial stages that are necessary to effectively deal with these and other earthquake hazard issues.

### Current Earthquake Planning Efforts in Oregon

Over the past few years efforts have been initiated by several entities to address earthquake preparedness in Oregon and in the Metro region. These efforts are crucial to Metro's efforts in that it is imperative to coordinate and not duplicate these actions during a time of scarce resources. Briefly, some important agencies that Metro will need to continue interactions with in developing a regional earthquake program are as follows:

Oregon Seismic Safety Policy Advisory Commission (OSSPAC) - Established during the 1991 Legislative Session by passage of Senate Bill 96. The mission of OSSPAC is to reduce exposure to earthquake hazards in Oregon by:

1. Developing and influencing policy at federal, state and local levels;
2. Facilitating improved public understanding and encouraging identification of risk;
3. Supporting research and special studies;
4. Implementation of appropriate mitigation; and
5. Preparing for response and recovery.

The OSSPAC has agreed to allow Metro to be an ad hoc member of this group. To date, Metro has completed policy papers for OSSPAC in the areas of lifelines, economics, education and research. These papers have resulted in OSSPAC establishing subcommittees to continue the work that Metro initiated in these areas. Additionally, OSSPAC is addressing building code requirements, land use and local emergency response planning.

Local Emergency Planners - Local emergency planners have initiated discussions on developing a Regional Disaster Response Plan with a focus on earthquake response capabilities. This would include a unified regional strategic decision-making structure, expanded resource training, joint exercises and mutual aid agreements. To date, these discussions have been slow. Several local emergency managers continue to voice concerns about working together on these efforts for various reasons including: lack of staff, competition for funding and a feeling of lack of political support for their efforts.

Department of Geology and Mineral Industries (DOGAMI) - The 1989 Session of the Oregon Legislature passed a bill (Senate Bill 955) which designated DOGAMI as the lead agency for earthquake hazard research in Oregon. DOGAMI has established a goal (to complete by 1995) to be able to predict earthquake affects in the state. The aspects of local geology that influence earthquake affects will be measured and analyzed in order to predict relative earthquake affects. DOGAMI is producing earthquake hazard maps for the major urban areas of western Oregon. Using detailed geologic mapping and geotechnical data, DOGAMI will produce a series of digital relative hazard map layers at a scale of 1:24,000. These maps will show relative liquefaction potential, relative amplification potential and relative earthquake-induced landslide potential.

The individual hazard map layers will be stacked to produce a composite relative earthquake hazard map. These maps may also be published to provide detailed hazard information in a format that will be easily understood by non-specialists. In the Portland area, the maps will also be provided in digital form to Metro, the regional service agency. Metro can incorporate

these data layers into the regional GIS system where the information can be used for sophisticated land use, engineering and emergency management planning.

Universities - Oregon State University, University of Oregon and Portland State University are continuing research efforts directed at a better understanding of seismic issues in Oregon. Metro will need to monitor these efforts and gain a more proficient working knowledge of these studies to incorporate them into our regional program. The universities could represent an extremely beneficial resource for Metro.

Oregon Department of Transportation (ODOT) - Currently, ODOT is conducting a study to assess structural stability of major bridges in the State of Oregon. ODOT's work will provide instrumental data regarding the economics and engineering design needs to retrofit highway critical structures for seismic activities. This information will also be useful in assessing potential transportation disruptions or structures that could become life threatening during or after an earthquake.

Utilities - The major utilities in the region have initiated discussions about the need to assess seismic safety in regard to their critical structures and service. Metro will need to work closely with these companies. Information from the utilities is a logical step in creating a regional emergency response map through the Metro RLIS system.

Media - The media has been doing an excellent job of providing earthquake information to the citizens of the region. Over the past six months their efforts have been significant in providing an understanding to emergency managers and scientists in the importance of public outreach on seismic issues. Metro needs to establish better informational contacts with the media regarding educating the region's citizens.

Red Cross - The Red Cross continues to be a crucial component of a regional earthquake program. This organization is currently undergoing major organizational changes to redirect

their priority focus toward Disaster Services. The Red Cross continues to support Metro's efforts in providing a regional approach to earthquake planning activities.

### **III. FY 1991-92 Earthquake Planning Work Program**

The following tasks are identified to initiate Metro's efforts in developing a regional earthquake preparedness program:

- Task 1 Work with DOGAMI and Metro's Data Resource Center to publish a seismic hazard map for the Portland area quadrangle. This will be the first quadrangle of several that will cover the Portland metropolitan area. Determine data needs to develop earthquake hazard scenarios in the long-term.
- Task 2 Assess Metro facilities to determine seismic risk to people and structures. Assess emergency response preparedness at all Metro facilities.
- Task 3 Continue efforts aimed at increasing funding resources for the region.
- Task 4 Work with affected agencies in developing a Regional Seismic Needs Assessment.
- Task 5 Continue efforts to establish Metro's role in Regional Emergency Management.
- Task 6 Conduct research on other local, state and regional earthquake programs. Provide information on these, as well as on Metro's work, in an outreach effort with interested persons in the Metro region.



**Task 7** Initiate work with local land use planners and DLCD to address earthquake hazard information in local land use plans.

## **Task 1-Regional Land Information System (RLIS) Mapping**

**Purpose:** The purpose of this task is to compile the data necessary to enable land use planners, emergency planners, businesses, utilities, volunteer organizations, citizens and local policy makers to make educated decisions regarding seismic mitigation and response. The most serious deficiency at this time is the lack of good data in a mapped form, that should be made available to a wide-range of interests.

### **Work Elements:**

- 1a. Continue work with DOGAMI to incorporate seismic data onto the RLIS system for publication. The Portland quadrangle is expected to be completed and published in FY 1991-92.
- 1b. Work with DOGAMI to develop a report which explains the seismic hazards identified on the maps for publication.
- 1c. Work with Metro's Data Resources Center, the California Division of Mines and Geology, DOGAMI, ODOT, utilities and universities to develop a comprehensive earthquake mapping program for the region. Such a program would include mapping geology, topography, soils infrastructure, utility structures and lines, transportation routes, and critical structures like hospitals, fire and emergency command centers. This information can be used to run earthquake hazard simulations that will be crucial to local state and federal emergency planners to train for an earthquake. Further, identification of comprehensive earthquake mapping needs will be a valuable tool for funding requests aimed at actually conducting the mapping work. Metro is in a unique position with the RLIS system in that it provides a great deal of leverage for federal and state funding requests which build on its capabilities.

## **Task 2-Metro Facilities Seismic Safety Assessment**

**Purpose:** The purpose of this task is to determine the state of preparedness of Metro facilities and personnel in the event of a moderate or significant seismic event. This task is prudent if Metro is going to be credible in development of a regional program. It is important to have our own house in order and insure the safety of the public utilizing these facilities.

### **Work Elements:**

- 2a. Review each Metro facility and emergency response plan if it exists.
- 2b. Identify potential hazards to people within or around the facilities.
- 2c. Establish a Metro committee to determine a course of emergency preparedness for Metro facilities, personnel and visitors.
- 2d. Develop a report of proposed actions necessary to insure emergency preparedness at Metro facilities. Key elements will include evacuation, education, training and identification of emergency response leaders for each working area or group.

## **Task 3-Funding**

**Purpose:** The purpose of this task is to get the necessary resources to effectively put in place the tools and outreach effort needed to have an effective earthquake planning program.

**Work Elements:**

- 3a. Continue efforts to request allocated FEMA funds for purposes of earthquake planning. Metro was successful in obtaining \$16,000 from FEMA to assist in the RLIS mapping project (primarily for publication).
- 3b. Work with state agencies to advocate the need for additional earthquake program funding for Oregon with Congressional delegations in the Northwest.
- 3c. Develop a funding request proposal to be used for discussions with Congressional representatives.
- 3d. Actively work to increase the awareness for the need to allocate funds to earthquake planning among local, state and federal policy makers through discussions with appropriate staff, organization of meetings between key political figures and project lead persons.

**Task 4-Regional Seismic Needs Assessment**

**Purpose:** The purpose of this task is to identify all the necessary components of a regional earthquake program and then determine the status of each component within that program. This work has been initiated by local emergency managers.

**Work Element:**

- 4a. Continue work with local emergency managers to develop a Regional Seismic Needs Assessment.

## **Task 5-Metro's Role in Emergency Management**

**Purpose:** The purpose of this task is to continue efforts with local governments, businesses, state and federal agencies, utilities, hospitals, the Red Cross and other interested parties to provide a catalyst for moving the region forward in a more cohesive effort in emergency planning. This involves clearly articulating Metro's commitment and available assistance toward this goal.

### **Work Elements:**

- 5a. Continue working with the local emergency managers as a member of their regional planning group (RPG).
- 5b. Participate on committees initiated for the purpose of discussing seismic issues as time allows.
- 5c. Continue discussions with the State Office of Emergency Management to incorporate Metro's role into their emergency management hierarchy (i.e., FEMA→State→Local Counties).
- 5d. Support/initiate legislation in coordination with OSSPAC, and appropriate agencies to enhance earthquake planning and response preparedness.
- 5e. Initiate discussions with Clark County, Washington to develop a bi-state emergency preparedness program.
- 5f. Work with OSSPAC to make a legislative amendment to Senate Bill 96 (passed in 1991 Session) to identify Metro as a full member of OSSPAC.

## **Task 6-Outreach**

**Purpose:** The purpose of this task is to provide interaction between Metro and appropriate people and groups to both increase our knowledge in earthquake planning and provide outside interests with information.

### **Work Elements:**

- 6a. Conduct three workshops for local government land use planners, emergency planners, local government officials and interested persons to explain how to use the seismic hazard maps (this task has been funded partially by the FEMA grant).
- 6b. Continue research with state agencies and universities across the country to become more knowledgeable about programs and activities that can be applicable for the Metro region.
- 6c. Continue sharing information with network of interested persons in the region. This will entail developing a comprehensive mailing list and periodic updates about key information to interested persons.

## **Task 7-Land Use**

**Purpose:** Goal 7 of the Statewide Planning Goals requires local governments to address hazards through their comprehensive plans and land use regulations. This earthquake planning program would be initiated by providing local governments with information they need to adequately manage hazard areas. The focus of this task is to mediate the impacts of identified hazards through land use implementation standards such as set back requirements, reinforcement of structures and identifying potential "non-buildable" areas.

**Work Elements:**

- 7a. Continue work with DLCD on identifying the range of seismic hazard data types necessary to assist land use planners in changing their plans.
- 7b. Continue working with OSSPAC in determining the scope of addressing seismic hazards in local land use plans.
- 7c. Initiate discussions with local land use planners about the seismic information Metro obtains from DOGAMI, and learns from DLCD and OSSPAC.
- 7d. Evaluate the need to conduct regional natural hazards management planning to address issues such as seismic activity, unstable slopes and floodplains.

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