IA 2 – Geologic Emergencies

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1 Purpose and Scope

Clackamas County is vulnerable to a variety of geological emergencies that can cause significant damage and hardship. This appendix outlines the tasks and responsibilities required to respond effectively to hazards and impacts related to earthquake, landslide, volcano eruption, and subsidence.

2 Situation and Assumptions

2.1 Earthquake

The Cascadia Subduction Zone lies just off the Oregon coast. This zone, where the Pacific plate is being submerged beneath the North American plate, is part of a larger subduction system that includes the seismically active, and extremely hazardous, San Andreas Fault and Alaskan earthquake zones. Clackamas County is well within the impact area for a major subduction earthquake occurring along the Cascadia Subduction Zone.

Earthquake hazard is created by tectonic movement within the earth's crust. This movement generates regional and localized ground shaking and/or soil liquefaction. After an initial seismic event, tremors or aftershocks can occur for an extended period of time, resulting in continuing structural damage and the need to repeat damage assessments. There are several known local and regional faults, both within the County and in the north Willamette Valley that could produce damaging earthquakes, with further geologic analyses ongoing. An earthquake measuring 5.6 occurred in March 1993 and caused damage throughout the County, especially in the Molalla area.

Recent studies indicate that the Pacific Northwest could be subject to subduction earthquakes ranging from magnitude 8.5 up to magnitude 9.1. Additional fault zones throughout the County and region may produce localized crustal earthquakes of up to magnitude 6.0. A local earthquake of magnitude 6.0 or a regional magnitude 9.0 earthquake is likely to cause substantial structural damage to bridges, buildings, utilities, and communications systems, as well as the following impacts to infrastructure and the environment:

- Liquefaction, lateral spreading, and differential settling
- Landslides and possible flooding

- Fires, explosions, and hazardous materials incidents.
- Disruption of vital services such as water, sewer, power, gas, and transportation routes.
- Disruption of emergency response systems and services.

Actual earthquake damage can vary significantly, depending on the nature and severity of the incident, localized soils, and structural vulnerability. Most injuries result from flying/falling building contents and debris.

Seismic vulnerability assessments have highlighted the need for seismic retrofit of critical facilities. As a result, the County has recently completed several structural and non-structural seismic upgrades in key facilities and is identifying additional areas for upgrades.

2.2 Landslide/Debris Flow

This hazard includes the down-slope movement of rock, soil, or other debris or the opening of sinkholes/subsidence. These hazards are often the result of other incidents such as heavy sustained rainfall, floods, earthquakes, or volcanic eruptions. Landslides occur frequently, often fueled by heavy rainfall combined with the moderate to high relief characteristics of the County's mountains and river valleys and can be exacerbated by wildfire or drought conditions that result in vegetation loss.

Through the Natural Hazard Mitigation Plan planning process, the County has mapped landslide-prone areas and has developed and implemented mitigation measures where feasible.

2.3 Volcano

The last known eruptions of Mount Hood, located on Clackamas County's eastern border, occurred in the middle of the 19th century. Such recent eruptions, as well as the thermal activity that continues to be present, suggest that molten rock is still within or beneath Mount Hood. Impacts associated with a volcanic eruption include pyroclastic flows (incendiary avalanches) and lahars (mud flows), river flooding, destruction of property and woodlands, risk to the Bull Run watershed, and volcanic ash fall. Heavy ash fall in Clackamas County could cause health problems for individuals with specific medical conditions, and create havoc with transportation.

Clackamas County has joined with regional partners and State and Federal agencies to develop a Mount Hood Volcano Coordination Plan that applies many of the lessons learned from the eruption of nearby Mount St. Helens. This plan identifies agency/jurisdiction responsibilities and establishes procedures for timely and accurate dissemination of warnings and public information.

3 Roles and Responsibilities

3.1 Primary County Agencies

3.1.1 Fire Defense Board

In a geologic emergency, the Fire Defense Board may be responsible for the following tasks:

- Coordinate fire agency response.
- Serve in Unified Command.
- Provide staff for Emergency Operations Center (EOC) operations.
- Provide life safety/rescue operations.
- Assist in warning and evacuation operations.
- Conduct welfare checks for employees.
- Provide situational awareness including reporting damage, road and weather conditions to the EOC.

3.1.2 Sheriff's Office

In a geologic emergency, the Sheriff's Office may be responsible for the following tasks:

- Coordinate law enforcement response.
- Serve in Unified Command.
- Provide staff to support EOC operations.
- Conduct search and rescue operations.
- Coordinate warning and evacuation.
- Provide security.
- Provide situational awareness including reporting damage, and road and weather conditions, to the EOC.

3.1.3 Transportation and Development

In a geologic emergency, the Department of Transportation and Development (DTD) may be responsible for the following tasks:

- Implement Building Safety Evaluation Program Coordinate public works response.
- Serve in Unified Command.
- Provide staff for EOC operations.
- Coordinate road and bridge inspection and assessment.
- Assist in traffic and crowd control by providing signs, barriers, equipment, and personnel.
- Provide and operate heavy equipment.
- Provide situational awareness including reporting damage, and road and weather conditions, to the EOC.
- Assess roads likely to be affected, develop alternate traffic routes, and determine barricade and signage needs.
- Assess emergency transportation routes and determine priorities for maintenance and debris removal.
- Coordinate debris removal from storm drains, roadways, public rights-of-way, and areas potentially impacting public safety or health
- Coordinate with utility providers to protect/restore services.

3.1.4 Health, Housing and Human Services

In a geologic emergency, the Health, Housing, and Human Services (H3S) may be responsible for the following tasks:

- Coordinate health and human services response.
- Serve in Unified Command.
- Provide staff for EOC operations.
- Assist those with access and functional needs.
- Identify critical facilities in at-risk areas.
- Coordinate emergency medical services and care for injured individuals.
- Assist in coordinating volunteer recruitment and deployment.
- Evaluate contamination of potable water sources and disruption of sanitary services; evaluate other environmental or public health concerns.
- Provide public health information to Unified Command/Public Information Officer (PIO) for dissemination to the public
- Work with the American Red Cross in opening and operating shelters for evacuated persons and services for access and functional needs populations

3.2 Supporting County Agencies

3.2.1 Clackamas County Disaster Management

In a geologic emergency, Clackamas County Disaster Management (CCDM) may be responsible for the following tasks:

- Implement the Emergency Operations Plan (EOP).
- Activate the Situation Assessment Team.
- Activate the EOC.
- Assist Incident Command.
- Advise the County Administrator and Board of County Commissioners.
- Facilitate the Emergency Declaration process.
- Provide staff to serve as EOC Managers.
- Coordinate with city, regional, and State counterparts.
- Request activation of Clackamas County Amateur Radio Emergency Services (CARES)

3.2.2 Public and Governmental Affairs

In a geologic emergency, Public and Governmental Affairs may be responsible for the following tasks:

- Provide staff for the PIO and Joint Information Centers (JIC).
- Develop and coordinate a Joint Information System.
- Work with local, State, regional, and federal jurisdictions.
- Gather, prepare, and have Incident Command approve all communications sent to media, jurisdictions, and employees.
- Disseminate incident information including:

- Incident status
- Evacuation routes and detours
- Traffic conditions
- Transportation options for those who need assistance
- Shelter locations and updates
- Systems for locating family, friends, and pets.

3.3 Community Partners

4.3.1 American Red Cross

The American Red Cross provides and manages shelter and mass care operations for citizens who are victims of disaster and feeding and support services for emergency responders. The American Red Cross will:

- Activate and operate emergency shelters for displaced citizens at the direction of Command.
- Provide feeding, basic health, and behavioral health services and welfare assistance.
- Provide family reunification support.
- Provide an American Red Cross liaison to the EOC.

4.3.2 Clackamas Amateur Radio Emergency Services

In a geologic emergency, CARES may be responsible for the following tasks:

- Request that HAM operators report actual or potential hazards and incident conditions to the EOC.
- Assist with Countywide damage reporting.
- Establish an incident-specific net operations plan

4 Concept of Operations

The primary agencies listed in this annex share primary responsibility for geologic incidents.

Smaller, more isolated geologic incidents are normally managed using internal and mutual aid resources, with various County agencies providing support as needed. However, effective response to a major incident will require the combined efforts and resources of all County agencies.

For example, during periods of volcanic ash fallout, H3S develops and disseminates critical health-related information through its Community Health Division. Law enforcement agencies have primary responsibility for evacuation triggered by geologic incidents. Fire agencies provide special teams to extricate victims from vehicles and to search for and rescue victims in a collapsed structure. The DTD Transportation Maintenance Division is responsible for keeping surface routes clear and/or establishing detour routes.

A major geologic incident is one requiring notification of CCDM, implementation of the EOP, and activation of the EOC. All geologic incidents are managed according to the National Incident Management System (NIMS) and Incident Command System (ICS).

As time permits, CCDM will also convene the Situation Assessment Team to gauge existing and potential risks and to determine appropriate actions that the County should take to minimize hazard impact.

All agencies tasked under this appendix will develop and maintain internal operating plans and implementing checklists consistent with the EOP.

5 Emergency Coordination

5.1 County

Depending on the numbers of people affected, the area and extent of the damages, and the response operations required, the incident initially may be managed from a field Incident Command Post or from Department Operations Centers. When an Incident Commander determines that incident response will require resources beyond those available day-to-day and through mutual aid, and the scope of the damage and response increase, and/or more agencies become involved, overall management of the incident will normally transfer to Unified Command in the EOC.

If time does not permit pre-coordination, the EOC should be notified as soon as possible. If the needed resources are not available, the County will request State assistance through an Emergency Declaration.

5.2 Cities

Cities have primary responsibility for the safety and well-being of their citizens and for resource allocation and emergency operations within their jurisdictions. Cities are encouraged to develop EOPs and to work closely with CCDM to integrate preparedness, response, and recovery activities. An intergovernmental mutual aid agreement between the County and cities is available to all jurisdictions that choose to participate. This agreement establishes procedures for requesting and providing mutual aid resources in a major emergency or disaster.

Cities may request County assistance through mutual aid or through an Emergency Declaration. All city emergency declarations need to be submitted to the County for forwarding to the State, as necessary.

5.3 Special Districts

County officials collaborate with special districts in coordinating emergency preparedness, response and recovery operations. An intergovernmental mutual aid agreement between the County and special districts is available to all jurisdictions that choose to participate. The agreement establishes procedures for requesting and providing mutual aid resources in a major emergency or disaster.

5.4 Regional

The emergency transportation routes receive priority damage assessment, maintenance, and repair to ensure that these major transportation corridors are available to move people to safety and to move personnel and equipment for response operations. (An emergency transportation routes map is available in the EOC Library.)

Clackamas County is a participant in the Inter-County Omnibus Mutual Aid Agreement that provides a framework for counties to request mutual aid from each other in emergencies, saving time and minimizing confusion during an incident.

5.5 State and Federal Assistance

Geologic hazards are monitored by the United States Geologic Survey (USGS). Seismic hazards or earthquakes are also monitored by the Pacific Northwest Seismograph Network. This network provides data from seismometers across Washington and Oregon and is administered by the University of Washington. Volcanic hazards are monitored by the Cascades Volcanic Observatory. These USGS sponsored agencies will work closely with County agencies in the event of an earthquake or volcanic eruption.

The Oregon Department of Forestry operates and maintains a network of instrumentation to identify potential landslides, and administers a landslide warning system throughout the State. The Oregon Department of Forestry is responsible for notifying the County when landslides warnings are being issued.

The National Weather Service (NWS) is responsible for alerting public agencies and the general public of potentially dangerous weather conditions and impending emergencies. The NWS forecasts daily winds from surface to 50,000 feet for Mount St. Helens and provides an ash fallout advisory whenever conditions warrant. The NWS forecast for the Portland area may be found at http://www.wrh.noaa.gov/pqr/ .

If incident response requires resources beyond those available to the County on a day-to-day basis and through mutual aid, Incident Command will request additional resources through an Emergency Declaration. EOC staff will forward the declaration to the Oregon Office of Emergency Management (OEM) for submission to the governor. OEM coordinates State resources and response and will seek a State declaration if necessary.

6 Annex Development and Maintenance

The primary agencies identified in this annex are responsible for ensuring that this appendix and supporting plans and procedures are updated at least annually, after every incident or exercise to which it applies, or as changes occur. CCDM is available to assist as requested.

7 Supporting Plans and Procedures

- Support Annex 1 – Evacuation
- Damage Assessment Plan
- Mt. Hood Volcano Coordination Plan
- Natural Hazard Mitigation Plan

8 Appendices

- Appendix A – Geologic Incident Checklist

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Appendix A Geologic Incident Checklist

The following action items are appropriate to most geologic-related incidents; however the action should be evaluated for appropriateness in any given situation and additional actions not listed here may be necessary.

Pre-Incident Action Items

- ❑ Maintain and revise, as needed, applicable response plans pertaining to geologic-related incidents, including the EOP and agency-specific standard operating procedures.
- ❑ Ensure necessary personnel participate in appropriate trainings and exercises.
- ❑ Ensure that emergency contact lists are updated and establish a pre-event duty roster for the EOC.
- ❑ Prepare radio messaging to be used by local radio stations and scripts to be used on local television station(s) for emergency broadcast. Include release instructions and maps as appropriate.
- ❑ Identify private and public agencies, local contractors, and vendors that could be affected by and/or involved in supporting the response to the incident.
    - o Incorporate into planning efforts.
    - o Develop memoranda of understanding with appropriate private businesses.
    - o Maintain list of contracts and vendors including their names, contact information, and their specialties.
- ❑ Provide public safety information and education programs regarding emergency preparedness and response to the anticipated incident.
- ❑ Work with the Planning Commission to ensure that new construction does not increase hazards or vulnerability threat.
- ❑ Pre-designate emergency transportation routes and alternate routes for areas vulnerable to geologic-related incidents.
- ❑ Implement seismic procedures and incorporate improvements to structures.
- ❑ Maintain equipment and supply inventories necessary to support geologic-related incidents including communications devices and warning systems.
- ❑ Familiarize staff with requirements for requesting State and Federal Disaster Assistance. *[Robert T. Stafford Disaster Relief and Emergency Assistance Act and Oregon Emergency Operations Plan]*

Response Phase Action Items

- ❑ All departments should keep CCDM and/or the EOC (if activated) informed of any major developments that could adversely affect response operations (e.g., personnel shortages, loss of firefighting equipment, etc.)
- ❑ Ensure actions are taken to protect personnel and emergency equipment from possible damage by the incident.
- ❑ Activate the EOC and staff as appropriate to the situation. For larger events that cross multiple jurisdictions, establish a Unified Command. Ensure multi-agency coordination.
- ❑ Develop work assignments for necessary ICS positions (recurring action). [*ICS Form 203: Organization Assignment List*]

- ❑ Estimate ongoing emergency staffing levels, shift rotation plans, and request personnel support.
    - o Consider the need for specialized staff such as engineers, building inspectors, heavy equipment operators, and/or environmental remediation contractors.
- ❑ Dedicate time during each shift to prepare for shift change briefings. [*EAP*]
- ❑ Notify local, regional, State, and Federal agencies/entities which may be able to mobilize resources to support local response efforts. Request a liaison to be assigned to the EOC.
- ❑ Confirm or establish communications links among adjacent jurisdiction EOC s, appropriate agency operations centers, and the State Emergency Coordination Center if activated.
    - o Confirm operable phone numbers and verify functionality of alternate communications resources, if necessary.
- ❑ Determine the type, scope, and extent of the incident (recurring). Verify reports and obtain estimates of the area that may be affected. Maintain situational awareness and keep command staff, support agencies, adjacent jurisdictions, and liaisons updated on situational changes. [*ICS Form 209: Status Summary*]
- ❑ Implement plans and procedures (including agency-specific protocols and standard operating procedures) specific to the incident. Ensure that copies of all documents are available to response personnel as necessary.
- ❑ Activate mutual aid agreements as needed. Activation includes placing backup teams on standby and alerting resource supplies of both potential and current needs.
- ❑ Develop procedures for registering mutual aid and other first responders as they arrive on the scene and receive deployment orders.
- ❑ Conduct damage assessment and develop reports. (recurring)
- ❑ Ensure that action is taken to protect personnel and emergency equipment from possible damage by earthquakes, being cognizant of aftershocks.
- ❑ Evaluate the need to conduct evacuations and sheltering activities (recurring).
- ❑ Activate resources to support evacuations and sheltering activities as necessary.
- ❑ Coordinate repair and restoration of essential services and vital systems and/or maintain situational awareness regarding status (in the case of essential services and vital systems that are the prevue of the private sector such as electricity).
    - o Secure assistance from private contractors and/or vendors as needed.
- ❑ Continuously determine the need for additional resources and request them as necessary through appropriate channels.
- ❑ Submit a request for emergency/disaster declaration, as applicable.
- ❑ Formulate emergency public information messages and media responses utilizing “one message, many voices” concepts. (recurring)
    - o Public information should be reviewed and approve for release by the EOC Manager and/or on-scene Incident Commander or designee prior to dissemination to the public.
- ❑ If appropriate, establish a JIC and designate a lead PIO for the jurisdiction.
- ❑ Maintain accurate records for reimbursement requests and historic information reports.
    - o All EOC and incident assignments, person(s) responsible, and actions taken should be documented in logbooks. *[ICS Form 214 – Unit Log]*
    - o All messages, and the names of those sending and receiving them, should be documented on the EOC log.

- Collect records and bills generated during the incident in order to ensure timely submittal of documents for reimbursement.

- ❑ Develop and deliver situation reports (recurring at regular intervals). *[ICS Form 209 – Incident Status Summary]*
- ❑ Develop and regularly update an EOC Action Plan (EAP) (recurring). *[ICS Form 202 – Incident Objectives, ICS Form 203 – Organization Assignment List, ICS Form 205 – Incident Radio Communications Plan, ICS Form 206 – Medical Plan, ICS 208 – Safety Message, Incident Map]*
  - Developed by the Planning Section, and approved by the EOC Manager and/or on-scene Incident Commander, the EAP should be discussed at regular intervals and modified as the situation changes.
  - Ensure objectives and tasks outlined in the EAP are implemented.
- ❑ Ensure that all reports of injuries, deaths, and major equipment damage accrued during response activities are communicated to the EOC Manager and/or on-scene Incident Commander.

Recovery/Demobilization Phase Action Items

- ❑ Develop a Demobilization Plan to assist in an orderly demobilization of emergency operation. *[ICS Form 221 – Demobilization Plan]*
- ❑ Activate, if necessary, appropriate recovery strategies outlined in continuity operations plans and/or continuity of government plans.
- ❑ Develop recommendations regarding changes in planning, zoning, and building codes/ordinances to lessen the impact of future emergencies related to this type of incident.
- ❑ Release mutual aid resources as soon as possible.
- ❑ Deactivate/demobilize the EOC, agency operations centers, and command posts.
- ❑ Conduct post-incident debriefing(s) to identify success stories and opportunities for improvement.
  - Develop an After Action Report based on these debriefings.
- ❑ Correct any deficiencies reflected in the After Action Report.
  - Revise any applicable emergency response plans based on the success stories and/or lessons learned during the response.

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