

## Section III: Hazard Specific Annexes

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### Annex 5: Earthquake

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### **Introduction:**

**Primary Agency:** Unified Command



### **Support Agencies:**

- Law Enforcement
- Fire Service Agencies
- Stillwater County Disaster and Emergency Services
- City/County 911 Dispatch Center
- Emergency Medical Services
- Public Works Agencies
- Public Health Agencies
- Montana DOT
- Montana Highway Patrol
- Montana National Guard
- Montana DES
- National Weather Service
- American Red Cross of Montana

### **Purpose**

To provide an organizational framework that will effectively utilize all available resource equipment and personnel within Stillwater County, control the dispatching of such equipment and manpower to locations where needed, and provide for effective operations at the scene during an emergency/disaster.

### **Scope:**

This annex addresses dam earthquake activities including warning, and shelter of extreme hazards causing a significant natural or technological disaster. The scope of this section will not attempt to address details regarding mutual aid responsibilities and procedures that are contained in other documents.

### **SITUATION AND ASSUMPTIONS**

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### **Situation:**

Stillwater County lies within 100 miles of the Inter Mountain Seismic Belt. . The County is located in the South Central part of the State with parts of the Absaroka Beartooth Wilderness running through the County.

Although there is no history of an Earthquake striking within the County, many of the larger earthquakes in the region have been felt in Stillwater County.

Land ownership in the county are divided into private, municipal (City, County and State) and the United States Forest Service (USFS).

There exist mutual aid agreements between the participating law enforcement agencies, fire services and EMS services within the County and with surrounding Counties which detail the support that each entity will provide and how the costs will be determined and paid. State and federal cost support may be available on incidents that overwhelm local jurisdiction resource capabilities.

Law enforcement, in addition to having 24-hour operational capability, have two-way radio communication links between their respective mobile units and the County.

Law enforcement, with the use of sirens and public address systems, are a valuable resource for disseminating warning and emergency information, and may do so when needed unless otherwise involved.

### **Assumptions:**

1. An Earthquake could happen within Stillwater County. Such an events probability and risk are very low for Stillwater County.
2. Some of these events will lead to added problems including, fire, mudslides, road, bridge and even building failure.
3. In a disaster, some emergency resources may become scarce or inoperable. State and other resources may be called upon.
4. Wheeled-vehicle access may be hampered by road or bridge closures due to failure or washout. Alternative type transportation may be called needed.
5. Efficient and effective mutual aid among the various local, county, and state, and federal emergency agencies require the use of the Incident Command System (ICS) together with compatible emergency equipment and communications.
6. In general, people have learned to prepare for it and protect themselves from serious consequences. However, when electric power is inoperable and roads are impassible, there is a real danger of a disaster.
7. Scores of fatalities and injuries could occur depending upon the time of day the earthquake strikes.

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8. In addition to structural damage to bridges and buildings, an earthquake of magnitude 6-8 on the Richter scale may be expected to result in:
9. Additional natural or technological emergencies such as floods, landslides, fires, explosions, dam failures, and hazardous materials incidents.
10. Disruption of vital utility services such as water, sewer, power and natural gas.
11. Damage to, and disruption of emergency response facilities, resources, and systems.
12. Civil and political emergencies, such as resource hoarding, price gouging, and fraudulent business schemes.  
Gasoline and food shortages due to commercial businesses not being able to open,
13. Telephone lines and radio repeater sites will probably be down after a major earthquake. Cellular phones may also be disrupted because of their dependency on landlines and repeaters.
14. Many streets and highways may be impassable due to debris and collapsed bridges and overpasses.
15. It may take days or weeks before an accurate damage assessment is available.
16. Demand for resources may be critical.
17. Enhanced public awareness via techniques such as citizen handouts, ad campaigns, evacuation routes and mapping information may be helpful.

### Concept of Operations

#### A. Direction & Control

- ◆ See the Direction and Control Annex in Section II: Functional Annexes.
- ◆ The Incident Command System will be implemented at all incidents. Following an earthquake with widespread damage, a Unified Command may be established among agencies or affected neighboring jurisdictions in order to assure more efficient management of scarce resources. In this event, the local Command and General Staff may co-locate with other neighboring jurisdictions in the best surviving facility. On-scene control will be delegated to the Operations Section Chief or to an on-scene Incident Commander.
- ◆ Incident Command:
  - a. **Response: Unified Command** is recommended. Representatives may include: LE, Fire, PW, PH, DESC, and CEO.
  - b. **Recovery:** Senior **Public Works** official or designee.  
\*Unified Command (*suggested*): PW, PH, DESC, NGO
- ◆ The Incident Commander will establish an Incident Command Post (ICP) as soon as possible and ensure that the location of the ICP and identity of the IC is disseminated to all responders.
- ◆ The IC will adapt the management structure to reflect the need and complexity of the incident. In accordance with other annexes, this may include, but is not limited to activating the EOC, establishing unified command, and requesting mutual aid support from neighboring jurisdictions.

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### **B: Operational Roles & Responsibilities**

#### **◆ American Red Cross (ARC)**

- Set up shelters.
- Conduct a windshield damage survey within the first 24 hours.
- Provide a locator service to answer inquiries about people in the disaster area.

#### **◆ Chief Elected Officials**

Declare an emergency and/or a disaster with up to a 2-mill levy, if appropriate. Separate declarations are required for each affected jurisdiction (county, Helena, East Helena.) A disaster declaration will allow a request to the MTDES for assistance.

#### **◆ Coroner's Office:**

The County Coroner's Office is the lead agency for the collection, storage, and disposition of all human remains and their personal effects.

#### **◆ DES Coordinator (DESC)**

- Manage the EOC, advise the CEO's and support field operations.
- Provide public information if the PIO is not available.
- Ensure that damage assessment and major events are being recorded.
- Hold periodic briefings when necessary for the EOC staff to exchange information.
- Act as liaison with MTDES.

#### **◆ Emergency Medical Services (EMS):**

Local Volunteer EMS services will transport and treat casualties. The emergency room can take up to 5 seriously injured patients. It has 12 beds with an emergency capacity of 30 beds and a 30-day stockpile of medicine. An emergency generator is available.

#### **◆ Emergency Operations Center (EOC):**

*(See the EOC Annex for more information)*

The EOC will provide support to the Incident Commander(s) in such areas as evacuation, communications, transportation, shelter, and any other resources required.

The EOC will be activated by the DESC and staffed by the elected officials and heads of the departments involved in the response or their designees. A worst-case earthquake scenario assumes that the quake would happen at night when key staff is at home, major arterials would be damaged,

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and all communications systems except car-to-car and portable radios would be inoperative for the first few hours following the shock. Since normal paging and call-back systems may be inoperative, members of the Emergency Management organization as well as others with ICS positions should automatically respond to the EOC as soon as possible *after ensuring the safety of their families*. EOC staffing should take place under the assumption that those personnel who must commute into Helena may encounter severe obstructions and delays.

A situation map will be maintained by the Planning Section in the EOC to illustrate the affected areas and any other pertinent information such as fires, flooding, impassable roads and alternate response routes.

ARES will provide emergency communications from the EOC to wherever requested in the field and for other agencies, such as the ARC.

Response personnel (Fire, Police, and Public Works Department employees) should report to their workplace.

### ◆ Fire Services:

County fire departments will fight fires, rescue victims, respond to hazardous materials incidents, provide emergency medical services, assist law enforcement with evacuation and assess damage. Damage reports will be reported to the EOC for collection and assessment.

### ◆ Law Enforcement:

Law Enforcement will be in charge of evacuation, perimeter security, and traffic control. Damage assessment will be reported to the EOC.

### ◆ Public Health:

- Issue a boil order immediately until it is determined that the water is safe to drink.
- Identify sources of safe drinking water during disaster situations.
- Public health nurses assist the ARC at shelters.
- Inspect shelters for sanitary conditions, including food and water supplies, wastewater and garbage disposal.
- Conduct damage assessment in licensed food facilities for contamination and refrigeration failures.
- Provide information on probable sewage contamination, identifying sources for portable toilets when needed, and providing information on appropriate clean-up.

### ◆ Public Works: (*County Road and Bridge, Town of Columbus Public Works*)

- Provide a representative to the Damage Assessment Group in the EOC.

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- Conduct a windshield damage survey within the first 24 hours and more intensive assessments as able.
- Coordinate in helping inspect priority buildings first, which are essential service, hospitals, nursing homes, and shelters. Damage assessment will be reported to the EOC. *See the Damage Assessment Annex for more information.*
- Debris removal, with an emphasis on roads that need to be cleared for emergency traffic.
- Restoration of basic services. Repairs to water and sewer mains, streets and bridges will be made in order of priority.
- Assist Law Enforcement with traffic control with the use of barriers and signs.

### **C. Authorities and Limitations**

- ◆ The Incident Commander (IC) has authority to coordinate the use of resources and personnel at the scene of the emergency.
- ◆ The Commissioners have the authority to declare a State of Emergency within their jurisdiction and the responsibility to request a state or federal declaration if appropriate.
- ◆ The Commissioners have the authority to enter into mutual aid agreements between their jurisdiction and other jurisdictions.

MCA 10-3-104 and 10-3-406 give the Governor and local chief elected officials the authority to *“direct and compel the evacuation of all or part of the population from an emergency or disaster area....when necessary for the preservation of life or other disaster mitigation, response, or recovery,”* and to *“control the ingress and egress to and from an emergency or disaster area, the movement of persons within the area, and the occupancy of premises therein.”*

- ◆ Law Enforcement has the authority to order evacuations and close roads in emergent circumstances.
- ◆ The MTDOT and the Federal Highway Administration have the authority to close state and federal highways and bridge structures.
- ◆ County Health Officers has broad authority over matters of public health to include air and water quality concerns, food supplies, wastewater systems, and disease prevention.
- ◆ City officials have the authority to condemn a building in the city as unsafe to occupy.

### **D. Warning and Notification**

See the Alert and Warning Annex in Section II: Functional Annexes.

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The DESC or his deputy will activate the EAS by contacting the **NWS (1-800-240-4596)** to initiate the message. If phones are down, a message may be hand delivered to the primary EAS station, KEMC Radio, 1500 North 30<sup>th</sup>, Billings, MT 59101. Radio and TV stations will copy the message and interrupt regular programming for the broadcast.

If communications are down, the most logical source of communications will be the local ARES organization, which is able to provide portable and self-sustained Ham radio communication that can link critical sites such as the EOC, shelters, hospitals and others that may be needed.

Earthquakes occur without warning. Follow-up confirmation on magnitude, epicenter, damage assessments, etc., will likely be received first through the 911 center and the media. The jurisdiction will also be inundated by the public with information on damage and life/safety concerns. The IAP must address facilitating and verifying those reports and requests.

### **E. Public Information**

#### **◆ Providing Information to the Public**

See the Public Information Annex in Section II: Functional Annexes

The EOC will be responsible for all emergency public education and information.

Once appointed, the Public Information Officer (PIO) will be responsible for public coordination and dissemination during the emergency and will clear all press releases through the Incident Commander or DESC. All approved press releases will be logged and a copy saved for the disaster records.

During the event, the PIO, in conjunction with the IC, will continue to provide pertinent information over radio and TV. The public will be reminded to remain calm, stay tuned for more information, and to follow the instructions of emergency management personnel. Such instruction may include guidelines for returning to homes, shelter accommodations, sanitation, and where and how to report damages. [Appendix 2.1 EAS Instructions To The Public](#)

The normal alert and warning systems may be down or limited following a major quake. It may be necessary to augment these systems with mobile public address systems, door-to-door contact, and posting notices on bulletin boards in designated public gathering places such as shelters

The PIO may also participate in a Joint Information Center (JIC), staffed by PIOs from various jurisdictions, to address the media with a single, coordinated voice.

#### **◆ Receiving Information from the Public**

Providing adequate communications means to receive information from the public, such as damage reports, sanitation problems, health issues, offers for donated goods, and other public safety-related problems, is the responsibility of the Communications Unit Leader and the PIO. This will probably be done by staffing public information lines and publishing the telephone number through the local media. The PIO must also ensure the information received is communicated to the appropriate EOC section to deal with it.

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### F. Considerations and Implementation Responsibilities

Every type of disaster has issues that are unique to that type of situation. This section is designed to point out the disaster specific issues or areas of consideration and what agency, private or governmental, is responsible to resolve that issue.

#### ◆ **Damage Assessment & Incident Stabilization:**

Damage assessment will take place in two phases: 1) the initial assessment, to determine general impact and damage to vital facilities and resources, and provide a brief overview of impact on citizens and businesses; and 2) subsequent, in-depth, assessments to determine the full extent of damage and the financial implications for disaster declarations and disaster assistance. Priorities in the initial assessment will be the restoration of emergency response and direction and control capability, and the saving of lives. (*see Damage Assessment Annex*)

In an incident requiring damage assessment, such as an earthquake or flood, a Damage Assessment Group will be organized under the Operations Section. This group will be lead by a Group Supervisor appointed by either the IC or Operations Chief. The initial assessment will take place under the direction of the *Damage Assessment Group*, with assistance from the *Planning Section* as needed. Priorities in the second phase will be to estimate damages, restore public services and facilitate disaster assistance. The *Finance Section* may provide assistance in Phase two assessments (cost analysis, budgeting etc.) The County does not have the resources to restore private residences or businesses.

#### 1. Initial Damage Assessment

2.

An aerial survey of the County should be performed as soon as possible after the initial shock. The results of this survey will facilitate further damage assessment on the ground. Local building officials will direct damage assessment on vital facilities according to their assigned Branch.

The initial damage assessment should be augmented by "windshield" surveys and citizen reports, in order to provide an estimate of numbers of private homes and businesses affected.

This survey should be completed as soon as possible, since it will provide the supporting documentation for a disaster declaration, and establish a base for the secondary assessment process.

An assessment of damage to utilities, and evaluation of the immediate needs of the population, especially water and sanitation services, should be accomplished as soon as possible.

Potable water is a major concern following an earthquake. Power and gas for heating may also be extremely important, depending upon the season.

#### 2 Secondary Assessment

The EOC Finance Section should begin gathering dollar figures associated with the damage to support requests for disaster declarations and assistance. Resources and facilities, which

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will be vital to the economic recovery of the County, should be surveyed. These include all hospitals, schools, financial institutions, and major employers.

### 3 Aerial Reconnaissance

The Civil Air Patrol, US Forest Service, MT Highway Patrol and a number of public and private resources may be utilized. This includes fixed wing and helicopter.

#### ◆ **Debris Removal:** *Public Works*

Removal of debris from public roads/highways is the responsibility of the agency that is responsible for its maintenance. Care should be taken to ensure that debris removal efforts are coordinated with other agencies that may have an associated responsibility. Removal of debris from private property is the responsibility of the property owner. (*see Debris Management Annex*)

#### ◆ **Environmental Protection:** *Public Health*

The Health Department will take the lead in issues of sanitation, potable water supply and disease prevention. It must be assumed that municipal water sources will be disrupted with the potential for contamination of drinking water caused by sewage and other sources of infestations. Food supplies may be compromised by contamination or lack of power. Refuse could accumulate to create harborage for insects, rodents and other disease carrying vectors.

#### ◆ **Evacuations:** *Chief Elected Officials*

Upon the establishment of the EOC, the Commission or their designee has the responsibility to order appropriate citizen evacuations utilizing local law enforcement or other emergency responders as deemed appropriate. Prior to the establishment of the EOC, the Incident Commander has the responsibility to recommend evacuations if the situation is imminently critical. (*see Evacuation Annex*)

#### ◆ **Power Outages:** *Northwestern Energy, Beartooth Electric, Yellowstone Electric*

Northwestern Energy will provide response to the loss of commercial power. Auxiliary power capabilities exist at the 911 Dispatch Center, County EOC, and hospital. Public Works also has access to portable generators.

#### ◆ **Road Closures and Emergency Transportation Routes:** *Law Enforcement*

State, County, or City law enforcement agencies working in conjunction with the MTDOT and County Roads Department can enforce the closure of roads and rerouting of traffic if necessary.

#### ◆ **Search and Rescue:** *Sheriff's Department*

If there is an earthquake sufficiently intense to cause buildings to collapse, every reasonable effort should be made to determine if these buildings were occupied and if so, efforts coordinated with qualified emergency personnel to locate any potential survivors. Additionally, if citizens are isolated due to collapsed bridges or other structures, every effort should be made to rescue these individuals as soon as is feasible.

#### ◆ **Shelter and Family Referral Services:** *American Red Cross*

If temporary lodging is needed due to earthquake, the ARC will activate, publish information concerning shelters, and manage shelter operations. It is critical that all relief efforts to shelter and

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feed citizens are a coordinated effort between the Red Cross and all affected communities. The EOC is the logical broker for this communication. Call:

- **Stillwater County District ARC 1-800-272-6688 (24 hrs)**

The Salvation Army may also be requested to provide shelters and mass feeding. Army operations will be coordinated through the EOC and Red Cross to prevent duplication of effort. Call 1-800-272-6668.

(see *Mass Care Annex*)

### ◆ **Special Populations: Law Enforcement**

As the situation dictates, it may be required to evacuate elderly and infirm citizens from nursing homes, foster homes and other public and private facilities. Special transportation and trained personnel may be required to accomplish this task. Incarcerated populations may also be required to be moved and this will require special transportation accommodations as well as trained security personnel.

### ◆ **Telephone Outages: Qwest**

Qwest and Sprint will provide response to the loss of conventional telephone service. Cellular telephones may not work when conventional lines are lost. If the interruption to phone service promises to be lengthy, or widespread, alternative communication such as Amateur Radio may be used to establish contact between the public and government facilities.

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### Appendix 5.1: EAS Instructions to the Public

(Provide the magnitude of the earthquake and the location and extent of damage, if known. If this is unknown, state that this will be made public as soon as it is available. )

- 1 Check for injuries and do not move the seriously injured unless they are in immediate danger.
- 2 Check utilities and shut them off only if they are damaged. If there is a gas leak, turn off the main gas valve next to your gas meter. Do not light matches. Open windows and doors and contact the power company. Leave and do not reenter the building until it is safe. (*Give location of Red Cross shelters*)
- 3 Emergency water may be obtained from melted ice cubes and hot water and toilet tanks, but not the bowl. *DO NOT use water from the toilet tank if you are using a chemical cleaning agent that is dispensed in the tank.* Bottled beverages are a good temporary substitute for water.
4. Ensure sewer lines are intact before flushing your toilet.
5. Check chimneys for cracks and damage. Unnoticed damage could lead to a fire. Approach chimneys with caution and keep your distance.
6. Be prepared for aftershocks.
- 7 Stay out of damaged buildings.
- 8 Do not use the telephone except to report emergencies.
- 9 Do not go sightseeing.
10. Cooperate with authorities.

### Appendix 5.2: Incident Stabilization/Restoration Priorities

When all else fails, the priority for restoration will focus on protection of life as the number one priority, followed by property and finally the environment. We realize that specific items may change based on the situation facing the decision makers at any given moment. The following lists are meant to be general guidelines.

#### **Facilities**

- ◆ 911 System, EOC, Hospitals
- ◆ Fire Stations
- ◆ Red Cross Shelters, (i.e. schools and churches)
- ◆ Water Treatment Plants
- ◆ Nursing Homes and other congregate care facilities

#### **Communication**

- ◆ City/County Emergency Communications
- ◆ EOC communications services
- ◆ QWEST lines

#### **Transportation**

- ◆ Primary arterials and buses/routes, freight service, ambulances, collector streets
- ◆ Evacuation assistance

#### **Personnel**

- ◆ Workers essential to recovery actions

#### **Water**

- ◆ Fire Suppression
- ◆ Potable water, Sanitation
- ◆ Industrial processes

*The priorities reflected in this diagram are general guidelines for returning the county to operational and economic normalcy only.*

Later priorities include:

- ◆ Pharmaceuticals
- ◆ Food
- ◆ Banking facilities
- ◆ Insurance Firms

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### Appendix 5.3: Mercalli and Richter Scales

The modified Mercalli and Richter scales are methods for measuring earthquakes. The Mercalli scale measures the intensity of an earthquake, and gives a rough idea of the amount and types of damage that may result at each level. The Richter scale measures magnitude, or the amount of energy released from an earthquake, but makes no direct estimate of damages. Each level, or point, in the Richter scale is 10 times more powerful than the previous point. For example, a six-point earthquake is ten times more powerful than a five, and 100 times more powerful than a four.

Soil and rock type, and distance from the epicenter, as well as the quake's magnitude affect damage caused by an earthquake.

#### MODIFIED MERCALLI INTENSITY SCALE

- I Not felt, except by a very few under especially favorable circumstances.
- II. Felt by only a few persons, especially on upper floors of buildings. Delicately suspended objects may swing.
- III. Felt quite noticeably indoors, especially on upper floors of buildings, but may not be recognized as an earthquake. Standing motor vehicles may rock slightly. Vibration like the passing of a truck.
- IV. During the day, felt indoors by many; outdoors by few. At night, some awakened. Dishes, windows, doors disturbed, walls make creaking sound. Sensation like heavy truck striking building. Standing motor vehicles rocked noticeably.
- V Felt by nearly everyone; if at night, many awakened. Some dishes, windows, etc. broken. Some cracked plaster. Unstable objects overturned. Disturbance of trees, poles, and other tall objects sometimes noticed. Pendulum clocks may stop.
- VI. Felt by all. Some heavy furniture moved; a few instances of fallen plaster or damaged chimneys. Damage slight.
- VII. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable in poorly built or badly designed structures. Some chimneys broken. Noticed by people driving motor vehicles.
- VIII. Damage slight in specially designed structures, considerable damage or partial collapse in ordinary substantial buildings; great damage in poorly built structures. Panel walls thrown out of frame structures. Factory stacks, columns, monuments, and walls toppled. Heavy furniture overturned. Some evidence of ground movement; changes in well water. Persons driving motor vehicles disturbed.
- IX. Considerable damage in specially designed structures; well-designed frame structures thrown out of plumb. Great damage and partial collapse in substantial buildings. Buildings shifted off foundations. Ground cracked conspicuously. Underground pipes broken.

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X Some well-built wooden structures destroyed. Most masonry and frame structures destroyed. Foundations and ground badly cracked. Rails bent. Landslides on riverbanks and steep slopes. Shifted sand and mud. Water washes over stream and lake banks.

XI. Few masonry structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipelines completely out of service. Earth slumps and slips in soft ground.

XII. Damage total. Waves seen on ground surfaces. Lines of sight and level distorted. Objects thrown upward into air.

The following table illustrates the approximate relationships between magnitude (Richter scale) and intensity (Mercalli), and the approximate radius of perceptibility:

Richter	Mercalli	Radius
3	I-III	15 miles
4	IV-V	30 miles
5	VI-VII	125 miles
6	VIII-IX	170 miles
7	X-XI	250 miles
8	XII	450 miles

These relationships are approximate. An earthquake of 6 on the Richter Scale could result in a Mercalli measurement either below or above the VIII-IX range, depending upon the depth of focus, distance from epicenter, and soil and rock types.