UTAH GEOLOGICAL AND MINERAL SURVEY
PLANNED EARTHQUAKE RESPONSE ACTIVITIES

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Special Emergency Response Procedures Developed
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INTRODUCTION

Purpose

The purpose of this document is to provide a guideline for UGMS personnel in the event of an earthquake in the Utah region that is large enough to have significant felt effects. All UGMS employees will receive a synopsis of this document and will be advised of their response roles to be met during such an earthquake. A synopsis of this document, and future modifications that may be necessary because of changes within state government or within the UGMS, will be in the UGMS employee handbook. In the event of an earthquake with significant felt effects, key UGMS staff (Director, Deputy Director, Senior Geologist for Applied Geology, and Earthquake Scientist) will immediately assume their responsibilities. Other employees will attend first to their personal safety and to the safety needs of their families and immediately thereafter, respond according to the response document.

UGMS response is coordinated through the Department of Natural Resource's (DNR) Emergency Operations Plan which identifies division responsibilities and procedures for responding to natural disasters. This document reflects the UGMS' general mandate to understand, document, and advise policymakers on geologic hazards (as part of the State's plan for Emergency Public Information) as well as assist agencies in documenting geologic hazards (as part of the State's plan for Damage Assessment and Damage Survey Reports) and in coping with hazardous materials.

METHODOLOGY

This document is the product of discussions and interviews with individuals who have had, or currently have, a role of emergency response or earthquake risk reduction: Walter Arabasz (Director, University of Utah Seismograph Stations); Lorayne Tempest Frank (Director, Utah Division of Comprehensive Emergency Management); Albert Haines (Former Salt Lake City Administrator); Walter Hays (Deputy Chief for Research Application, Office of Earthquakes, Volcanoes, and Engineering, U.S. Geological Survey); and, Al Rogers (Branch Chief, Geologic Assessment Branch, U.S. Geological Survey). Several UGMS staff contributed their ideas to the report; specifically, Genevieve Atwood (Director), Don R. Mabey (Deputy Director), and Doug A. Sprinkel (Senior Geologist for Applied Geology). Mary Noonan, research assistant at UGMS, wrote the report.

The discussions provided a forum to consider not only the role of the UGMS in the event of an earthquake, but also the capabilities and responsibilities of the larger geologic community. A related but separate document, "The Roles of the Earth-Science Community in the Event of a Major Earthquake Affecting Utah",

outlines the general responsibilities of the various entities in the greater earth-science community. It is a non-binding document which addresses critical emergency response functions in the hopes that all key earth-science tasks will be addressed after an earthquake.

This document was undertaken in response to a workshop jointly sponsored by the United States Geological Survey (USGS), Federal Emergency Management Agency (FEMA), Utah Division of Comprehensive Emergency Management (CEM), and UGMS in 1985. The meeting identified a need for a special emergency response procedure specifying the UGMS role immediately following an earthquake. In October 1985, FEMA awarded the UGMS a one-year contract to develop these procedures. Comprehensive Emergency Management personnel, including Lorayne Tempest Frank (Director), Ralph Findlay (Section Chief for Plans and Preparedness), and James Tingey (Earthquake Preparedness Planner) worked closely with the UGMS project staff in writing this document. The project has resulted in a closer working relationship between CEM and the UGMS.

The document is divided into two sections--the first to be implemented in the event of an earthquake that causes minor or moderate damage and the second to be implemented when a major earthquake occurs. The distinguishing factor is the extent of damage. For the purpose of this document, a major earthquake is defined as an earthquake that causes damage to the extent that the State of Utah establishes an Emergency Operations Center (EOC) and a moderate earthquake is an earthquake that causes significant damage in Utah but not to the extent that an EOC is established.

UGMS RESPONSE OBJECTIVES

As the lead state agency responsible for understanding, documenting, and responding to geologic hazards, UGMS has incorporated several key objectives into the earthquake response document. First, the UGMS will coordinate its response efforts with those of the Department of Natural Resources. Second, the UGMS will respond to the needs of CEM and the State Disaster Assistance Task Force for technical information and for advice. Third, the UGMS will respond to public safety needs for hazards assessments and other earth science needs that can reduce loss of life and damage to property. Fourth, UGMS will participate, to the extent possible, in documenting short-lived phenomena caused by the earthquake in the hopes that this information will further the understanding the earthquake. Fifth, UGMS will provide leadership to Utah's earth science community in understanding geologic phenomena and related hazards and encourage state and local government action to reduce risk.

After a moderate or a major earthquake, UGMS has the lead responsibility to deploy staff geologists to assess geologic hazards associated with the earthquake such as landslides, liquefaction, and ground-water hazards. As part of its support function to CEM, UGMS has lead responsibility to write damage assessment reports for geologic phenomena but not for engineered structures. During the follow up phase after the event, UGMS has lead responsibility to understand and document what happened locally, to be the repository for scientific observations and information about the event, and to communicate to policymakers, the public, and earth scientists what was learned from the earthquake, including how to better prepare for future events.

UGMS response to a "moderate earthquake" (EOC not established)

When the UGMS becomes aware of an earthquake event in the Utah region that does not appear to have caused enough damage for CEM to actuate an EOC, the main functions of UGMS will continue as usual. The State Geologist will continue to report directly to the Executive Director of DNR and coordinate all activities with them. The State Geologist will respond to the needs of CEM including providing technical advise about the geologic hazards and will be available to respond to the press. The Senior Geologist for Applied Geology is responsible to deploy UGMS resources in response to CEM, DNR, and other state and local agencies requests for assistance. This will include determining priorities and communicating with the USGS and with the U of U Seismograph Stations (UUSS). The Senior Geologist for Applied Geology will determine the need to document the phenomena, monitor the risk of related geologic hazards, and report findings to CEM and managers of critical facilities.

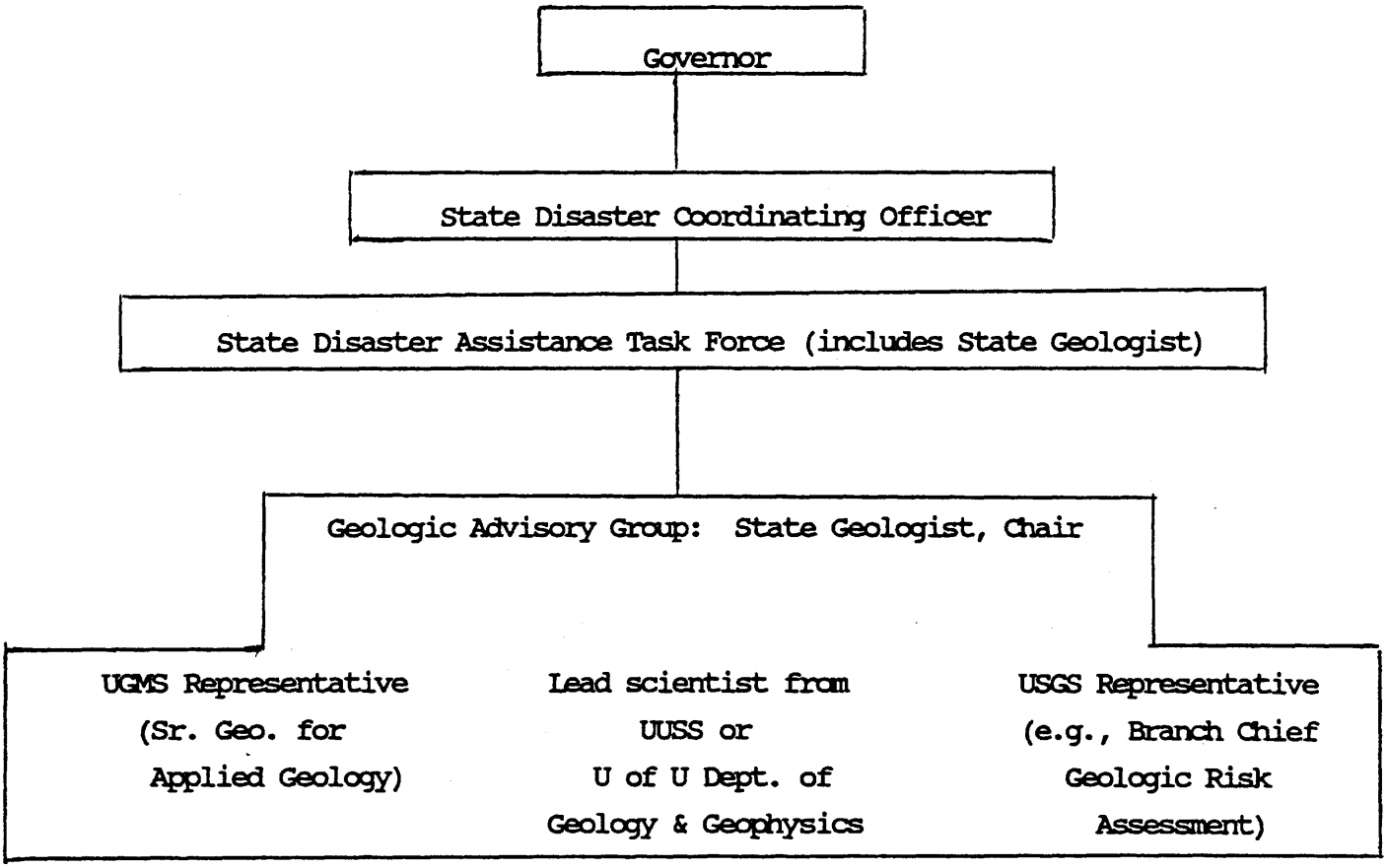
Unless otherwise instructed, all other UGMS staff members will continue normal functions. The usual supervisory chains-of-command will be in place.

UGMS response to a "major earthquake" affecting Utah (EOC established)

The responsibilities of UGMS are similar for a major earthquake as for a moderate earthquake but the tasks will require much more of UGMS' limited resources. The responsibility to communicate reliable information to decisionmakers will take much more effort as will the role of providing coordination and leadership among earth scientists. This document proposes the establishing of a Geologic Advisory Group, chaired by the State Geologist to respond to these needs. If this group is not convened or for some reason does not function at the EOC, then most of the responsibilities attributed to them in this report will be performed by the UGMS.

Because of the major impact on UGMS resources, this response document modifies agency personnel roles during the emergency response period to assure that critical response objectives are addressed. One objective of this document is to have individuals carry out emergency functions as closely related as possible to their non-emergency roles as UGMS staff. Three UGMS staff members will report to the State EOC: the State Geologist (Director, UGMS), the Senior Geologist for Applied Geology, and the Earthquake Scientist. The UGMS Deputy Director will be Acting Director of UGMS stationed at the UGMS headquarters and will deploy UGMS resources. The following organization chart and position descriptions delineate UGMS staff roles after a major earthquake affecting Utah.

Organization Chart for UGMS role in responding to a major earthquake and position descriptions for UGMS staff



At State EOC: UGMS Earthquake Scientist receives emergency observations and requests for assistance

At UGMS: Deputy Director deploys UGMS resources to assess hazards and to document geologic phenomena.
Applied Geology Program: assesses hazards.
Geologic Mapping Program: documents short-lived phenomena.
Economic Geology Program: assists in field investigations.

Geologic Advisory Group

Composed of the State Geologist (chair), a UGMS representative (Senior Geologist for Applied Geology), a lead scientist from UUSS or the U of U Department of Geology and Geophysics, and a representative from the USGS Geologic Division.

Location: State EOC

Purpose: Facilitate communication of reliable information among earth scientists and to decisionmakers.

Tasks and responsibilities:

1. Receive geologic information and determine what has happened.
2. Provide status reports to the State Disaster Assistance Risk Force and to the press.
3. Central source for receiving information about the geologic aspects of the event and to make available as reliable, timely, and accurate information as is possible.
4. Provide communication link among earth scientists. Coordinate efforts of unaffiliated earth scientists, non-earth scientist observers; encourage and facilitate meetings and sharing of information among earth scientists.
5. Represent earth scientists at EOC, know which earth scientists are doing what, specifically activities of UGMS, USGS, University scientists, Federal earth scientists, county geologists, state agency earth scientists and national review teams such as from the National Academy of Sciences, Earthquake Engineering Research Institute, and the Interagency Committee on Seismic Safety in Construction.
6. Communicate priorities for earth scientists response for public safety and communicate priorities for needed scientific observations.
7. After the event, document and evaluate the response of the earth-science community.

Back-up: If for some reason the Geologic Advisory Group is not formed or does not function at EOC, State Geologist will report to EOC and act without a committee for support.

State Geologist/Director, UGMS

Location: State EOC

Purpose: Chairs the Geologic Advisory Group, represents the earth-science community to policymakers and facilitates inter-governmental cooperation.

Tasks and responsibilities:

1. Serve on the State Disaster Assistance Task Force.
2. Chair the Geologic Advisory Group. With members of the Group, interpret technical data.
3. Communicate information to policymakers, CEM, and others as necessary.
4. Inform policymakers of responsibilities and activities of earth-science entities.
5. Coordinate with members of Department of Natural Resources team and with Department of Natural Resources response efforts.

6. Coordinate the geologic information and earthscience observation activities of non-governmental observers. (Other State and Federal agencies coordinate response roles of these individuals):
   a. Professional groups (members of Utah Geological Association, Association of Engineering Geologists, American Institute of Professional Geologists, etc.)
   b. Press
   c. Public
   d. Non-government geologists
   e. Industrial firms

Back-up: If the State Geologist is unavailable to perform assigned duties, UGMS Deputy Director will perform all tasks and responsibilities assigned to State Geologist.

Deputy Director/Acting Director, UGMS

Location: UGMS Headquarters

Purpose: Supervises the UGMS response to the earthquake while the UGMS Director is stationed at EOC.

Tasks and Responsibilities:

1. Make overall UGMS personnel assignments.
   a. Applied Geology Program: assess earthquake-related hazards and risks; document short-lived phenomena.
   b. Geologic Mapping Program: document short-lived phenomena caused by the earthquake.
   c. Economic Geology Program: respond to specific assignments to do geologic investigations.
   d. Support and Administrative Programs: Duties as assigned to maintain operation of UGMS and assist in earthquake investigation.
2. Deploy UGMS equipment and other resources as necessary.
3. Communicate regularly with Senior Geologist for Applied Geology and State Geologist at EOC.
4. Work directly with DNR team. Communicate directly with Executive Director of DNR.
5. Respond to specific requests for special studies of geologic risks.
6. Respond to specific requests from State Geologist (e.g., helping to coordinate volunteers).
7. Respond to priorities identified at the EOC and communicated to the UGMS by Senior Geologist for Applied Geology or by State Geologist.

Back-up: If the Deputy Director is unavailable or functioning as chair of the Geologic Advisory Group, the Senior Geologist for Mapping or if he/she is unavailable, the Senior Geologist for Economic Geology will serve as the Acting Director, UGMS and perform all tasks and responsibilites assigned to the Deputy Dir./Act'g Director.

Senior Geologist for Applied Geology

Location: State EOC

Purpose: Represent UGMS on the Geologic Advisory Group

Tasks and responsibilities:

1. Participate in the Geologic Advisory Group and advise the State Geologist concerning the earthquake and associated hazards.
2. Understand what is going on and what are the most important priorities for UGMS staff.
3. Understand what UGMS staff are doing and what they are learning about the event.
4. Communicate regularly with the UGMS.
5. Communicate UGMS needs to Deputy Director (Acting Director, UGMS) who will see that the work is completed.
6. Supervise UGMS personnel who are stationed at the emergency operating center, including:
   a. The Earthquake Scientist.
   b. Other UGMS personnel, as requested.
7. Request additional UGMS personnel to report to the emergency operating center, as needed.

Back-up: If the Senior Geologist for Applied Geology is unavailable, the Earthquake Scientist will serve as the UGMS representative on the Geologic Advisory Group and perform all tasks and responsibilities assigned to the Senior Geologist for Applied Geology.

Earthquake Scientist

Location: State EOC

Purpose: Receive hazards observations and requests for hazards assessments.

Task and responsibilities:

1. Report to the Senior Geologist for Applied Geology at EOC.
2. Receive reports of geologic hazard observations.
3. Assess the observations as to the potential for risks and hazards, evaluate the need for concern, and advise the Senior Geologist for Applied Geology for the need to deploy assistance.
4. Communicate information to lifeline personnel as necessary.
5. Keep the Senior Geologist for Applied Geology well-informed of important communications.
6. Respond to specific requests from Senior Geologist for Applied Geology.

Back-up: If the Earthquake Scientist is unavailable, the Senior Geologist for Applied Geology will assign another geologist from the Applied Geology Program to perform the assigned tasks and responsibilities.

GENERAL ACTION ITEMS AND POLICIES

Communicating to key UGMS response individuals

1. Following pre-established notification procedures, both the USGS Earthquake Information Center at Golden, Colorado and the UUSS are responsible for identifying the location, time, and magnitude of an earthquake and for notifying appropriate agencies and policymakers, including UGMS. CEM will notify the UGMS Director of the effects of the earthquake and the location of the EOC if one is established. If CEM is unable to contact the Director it will follow the pre-established calling order and reach someone at UGMS. (See attached "call down" list. This information will be kept up-to-date).

2. The UGMS Director will contact the Deputy Director, the Senior Geologist for Applied Geology, and the Earthquake Scientist. If these individuals are aware of a moderate or major earthquake, they should contact the Director; if the Director is not available, then the Deputy Director; if the Deputy Director is not available, then CEM. If unable to reach any of these, then each individual will report immediately to his/her assigned work place.

3. The Earthquake Scientist will contact the Deputy Director or the Senior Geologist for Applied Geology directly or through CEM (533-5271). If unable to do so, the Earthquake Scientist will report immediately to the EOC.

4. When other UGMS staff members become aware of an earthquake causing significant damage in Utah, they should attempt to contact their supervisor or other UGMS management personnel directly or through CEM (533-5271). If normal telephone communications are not functioning, they should assume a major earthquake has occurred and respond according to the roles outlined in the Earthquake Response Plan.

INITIAL RESPONSE

1. UGMS Director, Deputy Director, Senior Geologist for Applied Geology, and Earthquake Scientist will report to their positions as soon as possible.

2. Other UGMS personnel will first respond to their personal safety and to the safety needs of their families. After this has been accomplished, staff members are expected to respond according to the Response Plan.

3. In the immediate emergency following a major earthquake, the role of the Deputy Director, Senior Geologists for Mapping and Economic Geology, and the Earthquake Scientist will depend upon circumstances.

3a. Depending upon the availability of the UGMS Director, the Deputy Director will either serve at the EOC and chair the Geologic Advisory Group or will serve as the Acting Director of the UGMS at UGMS headquarters.

3b. Depending on the availability of the Director and Deputy Director to perform assigned responsibilities, the Senior Geologist for Mapping or Senior Geologist for Economic Geology, in that order, will either assume the responsibilites of Director and/or Deputy Director or function as leaders of the staff of their respective programs.

3c. Depending on the availability of the Senior Geologist for Applied Geology, the Earthquake Scientist will either assume the responsibilities of the Senior Geologist for Applied Geology on the Geologic Advisory Group or report to the EOC.

4. If telephone communications are functioning, other UGMS staff members should try to reach the UGMS or their supervisor for instructions from the Deputy Director. If direct communication with UGMS is not possible, staff should attempt to communicate through CEM (533-5271) and their emergency facilities accessed through the Highway Patrol or county emergency operations. If communications are not functioning, staff members should assume that they are needed and should report to the UGMS headquarters as soon as practicable. If UGMS employees in the field become aware of an earthquake in Utah, are unable to determine the extent of damage, and cannot establish contact with the UGMS or CEM directly, they should assume it is a <u>major earthquake</u> and return from the field with any vehicles they are using.

5. In the event of a <u>major earthquake</u>, vehicles and items such as gloves, cameras, film, radios, flashlights, etc., will be very important. Although additional equipment will eventually become available, UGMS personnel should be aware that their personal supplies could be of critical importance (particularly just after the event) and should be brought to the UGMS. Employees should also prepare ahead of time a plan for securing their homes and property and for getting to work in case the usual transportation routes and means are unavailable.

6. Employees should assemble at the UGMS headquarters. If UGMS building does not appear to be functioning, a notice will be posted on the grounds stating the back-up location.

7. The Deputy Director will supervise the UGMS and will be working through the Senior Geologists and others to keep the agency functioning and contribute as effectively as possible to the emergency response and information gathering responsibilities. The usual supervisory chains-of-command will be in place, the only exception may be UGMS personnel at the emergency operating center (EOC) who are on assignment to CEM and have responsibilities to participate as DNR/UGMS/EOC team members.

CALL DOWN LIST

After-hours telephone notification plan for the UGMS in order to respond to natural hazard emergencies.

UP-DATE THIS LIST AND PROVIDE IT TO CEM AND OTHERS AS FREQUENTLY AS NEEDED.

Director
Genevieve Atwood
539-1896 or 259-7099

Deputy Director
Doug Sprinkel
782-6375

Sr. Geologist, Applied Geology
Gary Christenson
278-0595

IF EARTHQUAKE -

Earthquake Scientist
Bill Case (Acting)
466-8956

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