DEPARTMENT OF THE ARMY
PACIFIC OCEAN DIVISION, CORPS OF ENGINEERS
FORT SHAFTER, HAWAII 96858-5440

REPLY TO ATTENTION OF:

CEPOD-EM

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: Anchorage Earthquake Catastrophic Disaster Response Plan (CDRP)

1. Purpose. To promulgate the US Army Corps of Engineers (USACE), Anchorage Earthquake CDRP.

2. Effective Date. This plan is effective upon receipt for planning, preparation and training purposes. Specified actions under Phase IIa, Activation, will be implemented automatically in the event of a severe earthquake in the Anchorage, Alaska area, pending a determination of the situation. The remainder of this plan will be implemented, in whole or in part, at the direction of the Commander, U.S. Army Engineer Division Pacific Ocean (POD). Support by USACE activities outside of POD will be activated by Headquarters, U.S. Army Corps of Engineers (HQUSACE), at the request of POD or on the initiative of HQUSACE.

3. Applicability. The Anchorage Earthquake CDRP is applicable to all organizations within USACE supporting response and recovery operations for an Anchorage, Alaska earthquake.

4. Discussion. This plan was developed under the USACE National Emergency Preparedness Program (NEPP) CDRP program. The purpose of this plan is to minimize the time required to provide assistance to the impacted area in the event of a catastrophic earthquake. The need for expedited assistance is particularly great because of the cold weather in Alaska during winter, which would cause additional casualties unless immediate assistance is provided. The procedures in this plan have been designed to compensate, wherever possible, for the lack of the pre-landfall warning period used in the more frequent POD hurricane responses.

5. Action. Commander, POD is responsible for providing support to FEMA and military installations and to provide command and control of US Army Corps of Engineers assets within POD. All organizations of Headquarters, Pacific Ocean Division and its Districts will review this plan and be prepared to execute assigned tasks immediately following a severe earthquake in the Anchorage, Alaska area. Each organization will become familiar with this plan and develop supporting checklists and/or Standing Operating Procedures (SOPs). Extracts of this plan may be used as necessary for planning and training. This plan and its supporting checklists/SOPs must be reviewed annually and updates/suggested changes furnished to POD by 30 September.

CEPOD-EM
SUBJECT: Anchorage Earthquake Catastrophic Disaster Response Plan (CDRP)

6. Proponent for this plan is the Pacific Ocean Division Emergency Management Office, ATTN: Kenneth Suiso, 808-438-8368.

Encl
Anchorage Earthquake CDRP

ROBERT L. DAVIS
Brigadier General, U.S. Army
Commanding

DISTRIBUTION: See Annex Z of Enclosure

HEADQUARTERS, USAED PACIFIC OCEAN
FORT SHAFTER, HAWAII 96858-5440
■■ 2004

ANCHORAGE EARTHQUAKE CDRP
SECURITY INSTRUCTIONS/RECORD OF CHANGES

SECURITY INSTRUCTIONS

1. This document is unclassified. Commanders of tasked organizations and friendly forces are authorized to reproduce this document, in whole or in part, for planning purposes.

2. The long title of this plan is Commander, U.S. Army Engineer Division, Pacific Ocean Catastrophic Disaster Response Plan for the Anchorage, Alaska Earthquake. The short title is Anchorage Earthquake CDRP. Both titles are unclassified.

RECORD OF CHANGES

Change Number	Date of Change	Date Entered	Person Making Change

RECORD OF REVIEWS

Annual Review By	Date	Remarks

HEADQUARTERS, USAED PACIFIC OCEAN
FORT SHAFTER, HAWAII 96858-5440
■■ 2004

ANCHORAGE EARTHQUAKE CDRP
PLAN SUMMARY

1. PURPOSE. This plan supports the Federal Response Plan and other plans that will be utilized in responding to a catastrophic earthquake in Anchorage, Alaska and adjacent areas. This plan covers the full range of USACE support, including support of regular Alaska District customers and reconstitution of the Alaska District. It is designed to compensate, as far as is possible, for the loss of the normal 72-hour advance deployment used before the landfall of a hurricane or for other predictable disasters.

2. CONDITIONS FOR IMPLEMENTATION

a. Phase IIa (activation) will be implemented immediately upon the report of a major earthquake in Anchorage, provided either there are reports of significant damage or Alaska District cannot be contacted to determine the local situation. This phase involves activation of operations centers and alert of persons for deployment; it does not involve travel outside the normal commuting areas.

b. The remainder of this plan will be activated upon direction of Commander, Pacific Ocean Division, or Commander, USACE, based on activation of the Federal Response Plan and/or receipt of other validated request for USACE assistance under this plan. Designation of Alaska District as a "victim district" may be based on a request by that district, a determination that the Alaska District meets the definition for a victim district, or on the inability of POD/HQUSACE to determine the condition of Alaska District.

3. OPERATIONS TO BE CONDUCTED

a. Force Requirements. If Alaska District is not able to provide the appropriate project management, Honolulu District will provide the management cell for Federal Response Plan operations and for support of the Alaska District's Civil Works program; Far East District will provide the management cell for support of response activities and continuing workload for military organizations. This plan requires the employment of Planning and Response Teams, ESF #3 personnel, and individual employees from throughout USACE. Northwest Division will provide personnel for initial support of activities in the Pacific Northwest area, including staffing of the Northwest Aloha Reception Center and representation at the FEMA Region X Regional Operations Center, pending full mobilization of USACE resources.

b. Employment. Teams and individual augmentees will be employed based on mission requirements. During the early stages of the response, access to the disaster area will be limited by both transportation availability and support capabilities within the impacted area. Transport and lodging of USACE personnel, equipment, and supplies must be incorporated into the overall Federal Time Phased Force Deployment List (TPFDL), managed by FEMA. To the maximum

extent possible, support personnel will be based in CONUS or Hawaii and will provide support via reachback.

c. Deployment. Persons responding to the disaster area must be prepared to work in severe weather and under austere conditions.

4. KEY ASSUMPTIONS

a. A severe earthquake in Anchorage will cause major infrastructure damage, will overwhelm State and local response capabilities, and will have significant impact on the USACE personnel who live in that area. Elmendorf AFB and Fort Richardson will be severely impacted by the earthquake; not only will their ability to support civilian relief efforts be impaired, but they will require response and recovery assistance from USACE.

b. Immediate response will be required to minimize loss of live and prevent further property damage.

c. Severe cold weather will increase the need for rapid assistance to the impacted area.

5. OPERATIONAL CONSTRAINTS

a. Response efforts will be limited by transportation availability. Transport of personnel, equipment, and supplies will be based on priority of need, in accordance with local/state requirements, and will be coordinated through FEMA.

b. Support facilities, such as housing and office space, will be in short supply; this will limit the number of response personnel that can be supported in the disaster area.

6. TIME TO COMMENCE EFFECTIVE OPERATIONS

a. Operations centers need to be activated nationwide, and personnel alerted for deployment, by 4 hours after the earthquake.

b. Initial response personnel need to be available, for potential deployment to Anchorage, no later than 6 hours after the earthquake. The initial primary points for debarkation will be Honolulu and Seattle.

7. COMMAND RELATIONSHIPS

a. The ESF #3 management cell will be under the command and control of Commander, USACE.

b. USACE response efforts, including those in the Puget Sound area, will be under the command and control of Commander, Pacific Ocean Division, who will be represented in the disaster area by the Commander, Division Forward.

8. LOGISTICS APPRAISAL The plan can be supported, provided that adequate resources are immediately mobilized to accomplish logistics support operations in the Puget Sound area.

9. PERSONNEL APPRAISAL The plan can be supported, but will require mobilization of personnel from throughout USACE. Due to the short time frame, the initial activation of FEMA's Regional Operations Center, the initial operations of the Northwest Aloha Reception Center, and possibly the initial deployment of personnel to the disaster area will require the use of personnel from Northwestern Division.

10. CONSOLIDATED LISTING AND IMPACT ASSESSMENT OF SHORTFALLS AND LIMITING FACTORS.

a. Most persons who could be activated for immediate deployment do not have suitable clothing for winter conditions in Anchorage. That could result in FEMA and/or DOD not allowing such personnel to board aircraft to deploy at the required time. If personnel did manage to deploy without appropriate cold weather clothing, they could become casualties.

b. Pacific Ocean Division has limited personnel available to support the response. POD is the smallest regular division in USACE, and POA has about 30 percent of the total number of U.S.-citizen civilian employees in POD. Augmentation from other USACE elements will be necessary to provide the required staffing for the disaster response.

c. Initial deployment of personnel and equipment to the disaster area will be prioritized. Transportation will initially be available only to support Urban Search and Rescue, medical care, shelter, food, and water. Support of these priority activities includes emergency electrical power, logistics, and minimum essential management personnel.

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ANCHORAGE EARTHQUAKE CDRP
BASIC PLAN

REFERENCES

a. **Maps and Charts**. See Annex B.

b. **Documents**:

a. (Initial) National Response Plan

b. Federal Response Plan (for Public Law 93-288, as amended), including Appendices for Alaska and Region X (The Plan).

c. National Incident Management System, U.S. Department of Homeland Security

d. National Oil and Hazardous Substances Contingency Plan (NCP), 40 CFR Part 300.

e. Department of Defense Directive 3025.1, Military Support to Civil Authorities (MSCA)

f. AR 500-60, Disaster Relief.

g. COMALCOM CONPLAN 5210, Civil Emergencies/ Natural Disasters.

h. COMUSAFAK OPLAN 5210, Civil Emergencies/Natural Disasters.

i. COMUSARAK CONPLAN 5210?

j. ER 500-1-1, Natural Disaster Procedures.

k. ER 500-1-28, Response Planning Guide.

l. U.S. Army Corps of Engineers ESF #3 Field Guide Supplement: All Hazards Contingency Plan

m. The Alaska Federal/State Preparedness Plan for Response to Oil & Hazardous Substance Discharges/Releases. (The Unified Plan)

n . The Cook Inlet Subarea Contingency Plan (regional supplement to The Unified Plan)

o . State of Alaska Emergency Operations Plan

p. Municipality of Anchorage Emergency Operations Plan

TASK ORGANIZATION: See Annex A

1. **SITUATION**

a. **General**. Anchorage is the major population, commerce, and transportation center in Alaska. It is in one of the most active seismic regions of the world, and has relatively severe winter conditions that can quickly kill persons who are not properly protected. Electrical and natural gas supplies would be reduced or cut off by a severe earthquake in the Anchorage area. In addition, many of the in-state resources and personnel needed for disaster response would themselves be seriously impacted by such an event. Immediate large-scale Federal support would be necessary to protect lives and prevent additional property damage. Military support would be provided by the Alaskan Command (ALCOM) functioning as, or organizing, a military Joint Task Force (JTF).

b. **Threat**. Two events are considered probable in the immediate future:

(1) A magnitude 7.5 shallow crustal earthquake within the Municipality of Anchorage, with significant damage occurring within the Matanuska-Susitna Borough and some damage within the Kenai Peninsula Borough. This earthquake could occur on the Border Ranges Fault (a known fault, but current activity a matter of debate) or on an unknown fault west of the Border Ranges Fault.

(2) A magnitude 8.0 subduction zone earthquake on the portion of the Alaska-Aleutian Megathrust Fault that runs directly under Anchorage. The failure zone would probably extend to the Sterling Highway area within the Kenai Peninsula Borough, and could also extend into the Palmer area in the Matanuska-Susitna Borough. The earthquake would cause major damages beyond the failure zone. The failure zone would extend northwest from a portion of the fault segment that was involved in the 1964 Good Friday Earthquake.

c. **Response Organizations**. (See Annex A for additional information.)

(1) Federal Civilian: The Principal Federal Official, appointed by the Secretary of Homeland Security, will coordinate all Federal response efforts, in accordance with the (Initial) National Response Plan. The Federal Emergency Management Agency (FEMA), part of the U.S. Department of Homeland Security (DHS), will coordinate Federal Stafford Act response activities, in accordance with the Federal Response Plan (FRP). The FEMA Regional Operations Center (ROC) will be immediately activated at Region X in Bothell, WA. The initial Federal on-scene response force within Alaska will be composed of representatives from Anchorage-area offices of the various Federal agencies participating in the FRP. These representatives will assemble at the Alaska Division of Emergency Services office (near the State Emergency Coordination Center) at Camp Denali on Fort Richardson, Alaska (the Federal Initial Operations Facility).

(2) Military: Northern Command (NORTHCOM) is the DoD planning agent for Military Support to Civil Authorities (MSCA) within Alaska, However, the military forces within Alaska are assigned to Pacific Command (PACOM). Alaskan Command (ALCOM), a subunified command under PACOM, is currently responsible for MSCA planning within Alaska. During an actual response, ALCOM may function as the Joint Task Force for military support.

(3) State: The state's disaster response activities will be coordinated through the State Emergency Coordination Center (SECC) at Camp Denali (the National Guard Headquarters area on Fort Richardson). All state agencies participate in the ECC. The SECC, the Alaska Division of Emergency Services, and the Alaska Division of Homeland Security form the Homeland Security and Emergency Services element within the Alaska Department of Military and Veterans Affairs. A working group from the Governor's cabinet provides policy guidance during state disaster responses.

(4) Local: The Municipality of Anchorage, the Matanuska-Susitna Borough, and the Kenai Peninsula Borough all have emergency management organizations that would coordinate local

responses. Boroughs and cities in the region have public works and contracting departments, although the smaller departments would be overwhelmed by the scale of the event.

d. **Assumptions**.

(1) Either of the two maximum probable earthquakes would produce sufficient damage to overwhelm local and State response capabilities.

(2) The Federal response will be conducted in accordance with the Catastrophic Incident Annex to the (Initial) National Response Plan. However, in accordance with the Plan's provision for site-specific modifications, additional power and heating assets will be required during the initial response.

(3) Either of the two maximum probable earthquakes would cause an initial loss of long-distance telephone communications, and would cause at least partial loss of local telephone service.

(4) The event will occur during the winter. Immediate action, including rescue and sheltering, will be necessary to prevent a significant number of additional deaths among victims of the event.

(5) A significant portion of the District workforce will be unable to immediately respond to a local disaster, either because of damage to access routes or because of personal or family impacts. Estimated availability is 25% of key personnel during the 4 to 12 hour time frame, and 33% through 50% of key personnel during the 12 to 24 hour time frame. (Availability would be lower for the 7.5 shallow crustal earthquake than for the 8.0 subduction earthquake.) Other agencies within the impacted area will have similar staffing limitations.

(6) The initial response will be with local personnel. Personnel from CONUS and Hawaii will arrive and begin performing response operations no later than 24 hours after the event. Initial supplies will arrive in Anchorage within 48 hours.

(7) Restrictions placed on local travel will initially be limited to areas of major damage. In Anchorage, that would include the downtown area, slide areas, damaged or suspect bridges, and possibly the midtown high-rise buildings (which could spread broken glass even if they escaped structural damage). Major bridges/overpasses within Anchorage will be either blocked off, or limited to light traffic, pending evaluation.

(8) Land access routes to Anchorage, from both directions, will be damaged. The Glenn and Seward Highways may allow limited traffic. The Alaska Railroad will be closed, pending track and bridge inspection and repair.

(9) One of the two major airfields in Anchorage (Elmendorf A.F.B. or Anchorage International Airport) will be operational within 24 hours.

(10) The Port of Anchorage will survive, but damage to cranes, pipelines, and other support equipment will interfere with port operations.

(11) The District Headquarters will survive the event, but may be damaged. Utility services will initially be interrupted.

(12) A portion of the District workforce will attempt to report to the District, provided

(a) Doing so will not endanger their families, or result in significant additional property loss, and

(b) They believe that such effort will help other victims of the event.

(13) USACE will not be involved in a second earthquake and/or catastrophic disaster response, and will be involved in no more than one other large-scale disaster response.

(14) The United States will not be involved in a major military contingency operation at the time of the earthquake, but will need to maintain military readiness for such an event.

(15) Response activities during the first week will be conducted 24 hours a day. Lighting equipment from the construction industry will be used to maintain operations at night.

(16) None of the Cook Inlet volcanoes will be active at the time of the earthquake.

(17) The primary CONUS staging, deployment, and logistics support area will be the Puget Sound area, including Sea-Tac Airport and McChord A.F.B. However, items from FEMA logistics center in California (and possibly from the centers in Hawaii, Texas, and Georgia) will normally be shipped directly to Anchorage.

(18) HAZUS data is used for the projected damages.

(19) Looting and civil unrest will be minor problems.

(20) Military cold weather supplies and equipment from Elmendorf A.F.B. and Fort Richardson will not be available during the primary deployment period.

2. **MISSION**. Provide timely assistance, as a supplement to State and local efforts, to save lives, prevent human suffering, and/or mitigate major property damage. This assistance may be provided under any appropriate legal authority, including those where the primary responsibility is assigned to another agency. In addition, the Alaska District will repair damages to USACE projects and to the facilities of those agencies that currently use Alaska District as their contract construction agent.

3. **EXECUTION**

a. **Commander's Intent.** POD will conduct response activities to save lives, alleviate human suffering, mitigate severe property damage, assist regular USACE customers, support the recovery of the community, and restore the capabilities of the Alaska District. This will be accomplished through rapid deployment of both POD-wide and USACE-wide resources in support of both the Federal Response Plan and regular Alaska District customers, including the military. The mission will be completed when local civil government is able to take over disaster recovery efforts and when the Alaska District is able to support customers through its regular procedures and with its regular staff.

b. **Concept of Operations.** This is a five-phase operation, requiring a total Division effort augmented by extensive support from throughout USACE. Alaska District will provide initial response, within surviving capabilities, until support can arrive from CONUS and from Hawaii. HQUSACE will provide an "ESF #3" management cell for the Disaster Field Office (DFO), and will provide various mission and functional Planning and Response Teams (PRTs) to accomplish the response and recovery operations. POD will deploy a "division forward" management cell while Honolulu District will establish an Emergency Response and Recovery Office (ERRO) to manage the primary operations. (However, the ERRO will be established as an element of the Alaska District, to facilitate closeout.) POH will also provide personnel to assist in the reconstitution of Alaska District, and to maintain the civil works program of the Alaska District in areas that were not impacted by the event. POF will provide personnel to support the internal response and recovery efforts of POA's regular military customers, and to maintain the military construction program in areas that were not impacted by the event. NWD will provide personnel for the initial USACE representation at the Region X ROC and for the initial logistics support. If transportation to Anchorage becomes available and the designated USACE representatives are

not yet available, appropriately trained Northwest Division/North Pacific Region employees may be required to deploy to Anchorage during the first 12 hours after the event. POA will reconstitute, and will support military and other regular customers in the repair of earthquake damages.

(1) Phase I: Pre-event planning. There is no warning phase involved, due to the no-notice nature of the threat. Phase I activities (e.g., training, procurement of equipment, and establishment of data systems permissions) are intended to speed up the response to an actual event.

(2) Phase II: Activation. This has two sub-phases

(a) Activation: assembling a minimum operating staff at each initial operating location, using local personnel, plus alerting response personnel for deployment. Normally, personnel will remain within their normal commuting area.

(b) Initial Deployment: deploying the initial USACE response team, from Hawaii and CONUS, to Anchorage, to the Region X ROC, and to other operational locations as required.

(3) Phase III: Deployment. The ESF 3 management team and PRT management teams become operational in Anchorage; initial delivery/production begins on critical missions.

(4) Phase IV: Response and Recovery Operations. The Emergency Response and Recovery Office (ERRO) is in charge of activities in Anchorage. Major response missions are accomplished; recovery missions are initiated. The Alaska District reconstitutes and begins to provide recovery support to its regular customers.

(5) Phase V: Transition and Closeout. The ERRO is closed out; management of recovery operations is transferred to the Alaska District. Alaska District accomplishes long-term recovery projects for its regular customers and for FEMA, and handles the administrative closeout of disaster accounts.

c. **Tasks.** (critical tasks are in bold type)

(1) Specified:

(a) **Support military forces in Alaska in maintaining/restoring mission readiness.** (POA)

(b) **Provide MSCA: Support Urban Search and Rescue Operations, plus safety evaluations of shelters and key operational facilities** (POA)

(c) Provide representation for ESF #3 and other USACE operations in the DFO. (HQUSACE, except POD and NWD provide interim representation.)

(d) **Accomplish ESF #3 missions.** (POA, or POH as replacement for a victim district, functioning through the ERRO.)

(e) Assist in operation of the logistics supply line from CONUS to Anchorage. (NWD LPRT, or other CONUS LPRT assigned by HQUSACE; NWD provides initial personnel)

(f) Provide support under PL 84-99 authority (POA, or POH as replacement for a victim district.)

(g) Maintain ongoing workload outside the disaster area (POA; Northern Area Office assisted by POH and POF for a "victim district" scenario.)

(h) Support long-term recovery of regular POA customers, including DoD activities, and potential new Federal customers. (POA, with initial support provided by POF and POH.)

(2) Implied: Assist ALCOM in the transition of missions from MSCA to contractor accomplishment. (POD and POA/POH/POF)

4. **ADMINISTRATION AND LOGISTICS.**

a. Concept of Support. A catastrophic disaster will cause a major shortage of resources within the affected area. The initial response will utilize on-hand resources. Once the FRP is activated, agencies will bring in resources from outside the disaster area and the logistical ESFs (ESF #1, Transportation, and ESF #7, Resource Support) will organize general support. USACE will deploy one or more Logistics Planning and Response Teams (LPRT) to participate in the multi-agency logistical operations; logistics support will be required in both Anchorage and the Puget Sound area. Other logistics participants are: FEMA; the General Services Administration (GSA); the Department of Transportation (DOT); the Department of Agriculture/Forest Service (USDA/FS); and the Department of Interior/Bureau of Land Management (DOI/BLM). The Joint Mobility Complex on Elmendorf AFB will be the primary Logistics point of arrival (POA) within the Anchorage area. Secondary points of arrival will be set up at Anchorage International Airport and at the Port of Anchorage. Most supplies and personnel will be transported to

Anchorage from the Puget Sound area. Materials from the FEMA logistics center in California, and to some extent materials from other FEMA logistics centers, may be shipped directly to Anchorage.

b. Logistics. As a DoD agency, USACE will receive logistical support from ALCOM. Logistical support beyond USACE/DoD capabilities will primarily be furnished by: ESF 7, Resource Support; and ESF 1, Transportation. Communications equipment will be supplied by ESF 2, Communications. Some needs will also be met by having personal supplies, such as cold weather gear, furnished to augmentees before they travel to the scene of the disaster. Southern Area Office/Richardson Resident Office will provide initial support to USACE activities at the Federal Initial Operating Facility/State Emergency Coordination Center. See Annex D for details.

c. Personnel. Significant activities under this plan will require major augmentation of the District and Division workforce. Planning and Response Teams (PRTs) and supplemental personnel will be furnished by all other USACE activities. Requests for assistance will be forwarded from the Division Forward to the Pacific Ocean Division EOC. POD will request assistance from the HQUSACE UOC for any personnel needs that cannot be met from within the division. See Annex E for details.

d. Public Affairs. The Disaster Field Office will establish a Joint Information Center (JIC) to coordinate the release of information to the public. The State of Alaska is expected to participate in this JIC. The purpose of the JIC is to insure the consistency and accuracy of information, and to emphasize the coordinated nature of the Federal and State responses. See Annex F for details.

5. **COMMAND AND SIGNAL.**

a. Command Relationships.

(1) HQUSACE is responsible for supervision of the ESF #3 management cell, at the Initial Operating Facility (IOF), at the Regional Operations Center (ROC) and, later, at the Disaster Field Office (DFO).

(2) Pacific Ocean Division, represented by the Commander, Division Forward, will be in charge of USACE response and recovery efforts. This includes supervision of the Emergency Response and Recovery Office (ERRO). Pacific Ocean Division will be in command of Alaska,

Far East, and Honolulu Districts (which are directly tasked to support this plan) as well as Japan District (which will provide general support).

(3) Alaska District is responsible for response and recovery activities conducted under regular authorities, such as military construction activities and wetlands/navigable water permitting activities. Alaska District's Northern Area Office, in Fairbanks, will serve as the Alternate Headquarters if the district headquarters is not able to function following the earthquake. During the longer-term recovery and closeout periods, Alaska District will also provide the "division forward" function and manage the ERRO.

(4) Honolulu District will be responsible for ERRO activation and support until Alaska District has reached adequate reconstitution. POH will also support Alaska District's civil works program during the reconstitution period.

(5) Far East District will be responsible for support of military installations until Alaska District has reached adequate reconstitution.

(6) Other ESFs will be managed by the appropriate primary agencies, as specified in the Federal Response Plan. In certain cases in Alaska, interim primary agencies will provide management at the Federal Initial Operating Facility until personnel arrive from the Lower 48. (See Annex A for the ESF matrix.)

(7) The Principal Federal Official (PFO) is personally designated by the Secretary of Homeland Security, for a catastrophic event, to coordinate overall Federal incident management and assistance activities across the spectrum of prevention, preparedness, response, and recovery. Duties of the PFO include: providing strategic guidance to Federal entities; ensuring the seamless integration of Federal activities in support of and in coordination with State, local, and tribal requirements; ensuring overall coordination of Federal domestic incident management and resource allocation activities; and facilitating interagency conflict resolution as necessary.

(8) The Federal Coordinating Officer (FCO) manages Federal resource support activities related to Stafford Act disasters and emergencies. The FCO has the authority under the Stafford Act to request and/or direct Federal agencies to utilize authorities and resources granted to it under Federal law (including personnel, equipment, supplies, and managerial, technical, and advisory services) in support of State and local assistance efforts.

(9) The State Coordinating Officer is responsible for coordinating the response activities of State agencies, and for coordinating all State and local requests for Federal assistance. The SCO is the Governor's representative and is normally the Director, ADES. The SCO is also responsible for furnishing priorities to the DFO when demands exceed resources.

(10) Within the DFO, the Response Operations Chief will provide coordination of those ESFs that come within that category. This role will not supersede the responsibility of each primary agency to manage its ESF. However, it will include oversight of missions that involve multiple ESFs, to insure proper coordination.

(11) Within the Operations Section, the Chief, Infrastructure Support Branch provides coordination for ESF #3, Engineering and Public Works, as well as ESF #12, Energy, and the FEMA Public Assistance Grant Program.

(12) The Defense Coordinating Officer (DCO) will be provided by ALCOM to serve as the point of contact to the FCO and the ESFs regarding requests for military assistance. For disaster operations, ALCOM will be serving as the local representative of NORTHCOM.

b. Command Posts.

(1) Pacific Ocean Division: Bldg. 525, Fort Shafter, HI. Division Forward location will be at, or close to, the ERRO. (Location can not be identified in advance.)

(2) Alaska District: Primary: Alaska District Headquarters, 2204 Third Street, Elmendorf AFB. Alternative: Richardson Resident Office, Bldg. 736 Ft. Richardson. In case of personnel and/or facility unavailability in the Anchorage Area, POA's Northern Area Office (Fort Wainwright, Alaska) will serve as Alternate Headquarters.

(3) Honolulu District: Bldg. 230, Fort Shafter, HI; however, the POH Emergency Operations Center is located in Bldg. 525 of Fort Shafter.

(4) Regional Operations Center: FEMA Region X Headquarters, Bothell, WA. (See location map in Annex B, Appendix 1, Tab D.)

(5) Federal Initial Operating Facility: Primary: Alaska National Guard Headquarters, Camp Denali, Ft. Richardson, AK (Rooms B201 and B202). Alternatives: see listing for State Emergency Coordination Center. (See location map in Annex B, Appendix 1, Tab D.)

(6) State of Alaska Emergency Coordination Center: Primary: Alaska National Guard Headquarters, Camp Denali, Ft. Richardson, AK (located in basement under the main drill floor). Alternative: Field facility established by the National Guard adjacent to their regular headquarters. . (See location map in Annex B, Appendix 1, Tab D.)

(7) Long-term DFO: To be established by FEMA, based on the specific post-disaster situation. The location can not be preselected, as availability is subject to both real estate market conditions and the effects of the event.

(8) ESF 3: Interim or long-term DFO.

(9) ERRO: To be determined, based on the situation.

(10) Northern Aloha Reception Center: to be determined (Seattle area).

(11) ALCOM: Building 9480 Pease Ave., Elmendorf AFB, AK; ALCOM headquarters will be located in the ALCOM Battle Staff Room, with the Crisis Action Team located in the Current Situation Room.

c. Succession to Command.

(1) Pacific Ocean Division: Deputy Division Engineer, followed by the senior assigned officer within the POD area of operations. (Alaska, Far East, and Japan Districts have O-6 commanders.) The succession list is maintained by the Division Executive Office, which will not be impacted by the event.

(2) Alaska District: Senior military officer. (If the senior officer is in Fairbanks, the senior available officer and appropriate civilian employees in Anchorage will use delegated signature authority for operational actions.)

(3) Honolulu District: Senior military officer. The list is maintained by the District Executive Office, which will not be impacted by the event.

(4) Alaska District Crisis Management Team: Deputy District Engineer (Chief, Programs and Project Management Division); Chief, Construction-Operations Division; Chief, Engineering Division.

d. Signal.

(1) In the event of loss of local telephone service, VHF radio will be used between the District EOC and its representatives–including the Interim DFO and Military Liaison Officers.

(2) In the event of loss of long-distance telephone service, satellite telephones and HF-SSB radio will be used between Alaska District and Pacific Ocean Division, and between Alaska District and any remote field teams.

(3) HF-SSB radio communications may require use of a relay station. The operator at the relay station would communicate with Alaska District by radio, and with the Pacific Ocean Division by telephone, fax, or e-mail. Potential relays are the Northern Area Office, the Chena Project Office, and the NWP radio center in Portland. POD does not have a permanently installed HF-SSB radio.

(4) A limited number of long-distance circuits will be quickly restored in the Federal Initial Operating Facility, at Camp Denali, as part of the State's emergency communications plan. ESF #3 will be provided with two telephone lines at that location.

(5) The Emergency Alert System will be used as the primary means of notification for employees who are not on duty when the event occurs. Contact with the Emergency Alert System will be through the Interim DFO and the SECC.

(6) USACE emergency command and control systems (CTOC, followed by a RRV, and possibly a DTOC) will be deployed to support response operations.

(7) See Annex K for detailed communications information.

ROBERT L. DAVIS
Brigadier General, U.S. Army
Commanding

Annexes
- A -- Task Organization
- B -- Intelligence
- C --Operations
- D -- Logistics
- E -- Personnel
- F -- Public Affairs
- G -- Civil Affairs
- J -- Command Relationships
- K -- Command and Control
- L -- Environmental
- M – Geospatial Information and Services
- X -- Execution Checklist
- Y -- Acronyms and Definitions
- Z -- Distribution

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ANNEX A TO ANCHORAGE EARTHQUAKE CDRP
TASK ORGANIZATIONS

ORGANIZATION

Headquarters, U.S. Army Engineer Division, Pacific Ocean (POD)
U.S. Army Engineer District, Alaska (POA)
U.S. Army Engineer District, Honolulu (POH)
U.S. Army Engineer District, Far East (POF)
U.S. Army Engineer Division, Northwestern (NWD) (Support)
U.S. Army Corps of Engineers, Western Processing Center (Support)
Headquarters, U.S. Army Corps of Engineers (HQUSACE) (Support)
Headquarters, Alaskan Command (ALCOM) (Coordination)
Headquarters, Pacific Command (PACOM) (Coordination)
Headquarters, Northern Command(NORTHCOM) (Coordination)
Alaska Division of Homeland Security and Emergency Management (ADHS&EM) (Coordination)
Department of Homeland Security, Federal Emergency Management Agency, Region X (FEMA X) (Coordination)
Alaska Regional Interagency Steering Committee (AK RISC) (Coordination)
Alaska Regional Response Team (RRT) (Coordination)

ATTACHMENTS:

Appendices
1: Deployment of USACE elements
2: Federal agency response
3: State of Alaska response
4: Local government response
5: Public utilities response

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APPENDIX 1 TO ANNEX A TO ANCHORAGE EARTHQUAKE CDRP
DEPLOYMENT OF USACE ELEMENTS

1. **General Considerations:**

a. Earthquakes do not provide advance notice. One of the key concerns in this response plan is to initially use the closest available assets, to partially compensate for the loss of the normal 72-hour pre-event deployment period used for hurricane responses. For this event, much of the initial response will need to be provided by Northwestern Division, Pacific Northwest Region. This is an interim measure, until HQUSACE is able to establish normal deployment schedules.

b. Personnel deploying to Alaska during phases II and III must be provided with appropriate clothing for the season prior to departure from CONUS (or Hawaii). This is a requirement from FEMA and ALCOM, as unprepared augmentees may themselves become casualties.

1. **Phase I:**

a. Pre-identify personnel for initial deployment.

b. Pre-issue cold weather clothing for initial deployment personnel.

2. **Phase IIa:**

a. **Pacific Ocean Division:**

(1) Activate EOC, CMT, CAT, and supporting personnel.

(2) Select and alert for deployment to Alaska:
(a) Division Forward Commander
(b) One TL or ATL

(3) Select and alert for deployment to Puget Sound area:: one supervisor for Northern Aloha Reception Center (NARC).

(4) Coordinate with UOC for recruitment of supplemental personnel. This will include ESF #3 staff, mission PRTs, function PRTs, Subject Matter Experts (SMEs), individual response workers, etc.

(5) Coordinate with UOC for official activation of the Northwestern Division (NWD) support as described in this plan.

b. **Alaska District:** Note: capability to perform the following missions will be limited because of the severe impacts to the District and its employees.

(1) Determine internal situation: accountability of personnel, status of facilities, etc. Report to POD as soon as communications are available (e.g., satellite phone)

(2) Deploy initial staff to State ECC/Federal Initial Operating Facility

(3) Assemble District EOC Staff/EM Staff at District Office

(4) Assemble District Crisis Management Team at District Office

(5) Assemble District Urban Search and Rescue personnel: District Office

(6) Activate District ATC-20 structural engineers (detailed inspections)

(a) Group a to SECC

(b) Group b to District Office

(7) Deploy Liaison Officer to ALCOM

(8) Activate Fairbanks Resident Office management personnel (potential Alternate Headquarters operations)

c. **Honolulu District:**

(1) Activate EM staff: regular office

(2) Activate EOC staff: District EOC, in Bldg. 525 Fort Shafter

(3) Activate Aloha Reception Center staff

(4) Activate CMT and CAT

(5) Activate Containerized Tactical Operations Center (CTOC) staff; prepare CTOC 2 for deployment to Alaska.

(6) Coordinate through POD to UOC for recruitment of supplemental personnel

(7) Assemble staff to execute POA's missions to support FEMA, including CEFMS, SITREPs, Response Documents/recruiting, etc. if POA is unable to accomplish due to communications and/or personnel shortfalls. This may range from short-term operations pending communications restoration through long-term replacement for a "victim district." This also includes ENGLink recruitment and other administrative support of POF's military support operations

d. Far East District:

(1) Alert management and technical personnel for potential support of Elmendorf AFB and Fort Richardson.

(2) Coordinate through POD to UOC for recruitment of additional personnel for support of military bases

(3) Coordinate with POH for CEFMS, P2, ENGLink, and other support.

Northwestern Division

(1) Deploy initial ESF #3 Staff (minimum 1 TL/ATL, 1 general support, 1 logistics): Region X ROC

(The first shift should be from NWS, due to the urgency of need.)

(2) Activate Northwest Aloha Reception Center, in Seattle District area, to support deployments.

(3) Activate 1 PAO representative (should be initially from NWS) at NWS or ROC, depending on situation

(4) Alert RRV team in Portland for potential deployment

(5) Activate NWP HF-SSB radio for possible relay of messages from Alaska

e. Prime Power, Fort Lewis, deploy 1 representative: Region X ROC; alert an additional representative for immediate deployment to Alaska

f. USACE, General (coordinated by UOC):

(1) Alert ERT-A team: coordinate with ROC for transportation from CONUS to Alaska

(2) Alert ESF #3 ROC team: Region X

(3) Alert Emergency Power PRT: coordinate with ROC for transportation from CONUS to Alaska

(4) Alert 249th Engineer Battalion (Prime Power) for potential deployment.

(5) Alert ATC-20 detailed inspection personnel: coordinate with ROC for transportation from CONUS to Alaska

(6) Alert Urban Search and Rescue personnel (structures specialists and technical search specialists): coordinate with ROC as to CONUS deployment location.

(7) Alert emergency Housing PRT management cell: coordinate with ROC for transportation from CONUS to Alaska

(8) Alert SPL RRV and SPK DTOS teams for potential deployment

(9) Alert SAM for potential deployment of CTOC 1.

(10) Alert Emergency Water PRT for potential deployment (in 24 hours)

(11) Alert Debris PRT for potential deployment (in 48 hours)

3. **Phase IIb** (additional to the Phase IIa personnel):

a. **Pacific Ocean Division:**

(1) Deploy Division Forward initial element: deployment may be either directly from Honolulu or through the Puget Sound Area (in coordination with FEMA and ESF #1). This deployment should include the Division Forward commander.

(2) Assemble full EOC staff.

(3) Deploy representative to Puget Sound area to serve as NARC supervisor.

b. **Alaska District:**

(1) Assemble additional staff at District Headquarters; if that building is not usable, employees will report to the location identified on commercial radio stations through the Emergency Alert System.

(2) Activate personnel to provide on-site logistics functions until arrival of Logistics PRT.

(3) Identify requirements for supplemental personnel for maintaining regular missions in other areas of Alaska.

c. **Honolulu District:**

(1) Deploy ERRO initial staff: deployment may be either directly from Honolulu or through the Puget Sound Area (in coordination with FEMA and ESF #1 at the ROC).

(2) Deploy CTOC staff and equipment (obtain confirmation through UOC)

(3) Establish the reachback data entry function for ENGLink, CEFMS, P2, and other systems as required to support response activities and regular Alaska District functions.

d. Far East District: Deploy personnel as required for management support of the response and recovery efforts on Elmendorf and Fort Richardson. Transportation requirements will be coordinated with PACOM.

e. Northwestern Division:

(1) Provide startup staffing for Northwest Aloha Reception Center, as required for initial deployment.

(2) When directed, move RRV and crew from NWP to designated location for deployment to Alaska (requires UOC authorization)

(3) Provide available ATC-20 detailed inspectors to assist in evaluating shelters and operating facilities in Alaska. SSA PRT mission management personnel may also be required initially to coordinate the detailed inspections and to begin planning for the regular SSA mission.

f. **249th Engineer Battalion** (Prime Power), Fort Lewis, 1 representative: deploy with initial FEMA delegation to Anchorage. (Representative could be provided by another detachment, provided deployment schedule could be met. A representative from Fort Shafter could potentially deploy with PACOM elements.)

g. **USACE, General:**

(1) Deploy ERT-A team; coordinate with ROC for transportation from CONUS to Alaska

(2) Deploy ESF #3 ROC team to Region X

(3) Deploy Emergency Power PRT; coordinate with ROC for transportation from CONUS to Alaska

(4) Deploy Structural Safety Assessment PRT management cell; location to be determined, tentatively Region X ROC.

(5) Deploy Emergency Housing PRT management cell; coordinate with ROC for transportation from CONUS to Alaska

(6) Authorize deployment of CTOC and RRV assets to Alaska.

(7) Alert Water and Debris PRTs for deployment.

4. **Phase III:**

a. **Pacific Ocean Division:**

(1) Deploy Division Commander, Deputy Division Engineer, or other senior officer to Anchorage as Division Forward Commander (if not deployed undcr Phase Iib).

(2) Deploy additional ESF #3/Division Forward personnel as available

(3) Recruit additional support personnel for EOC.

(4) Coordinate with UOC for recruitment of personnel to fill ERRO structure.

b. **Alaska District:** Under the victim district concept, turn over missions to incoming personnel and begin internal recovery activities.

c. **Honolulu District:**

(1) Deploy full ERRO Staff to Anchorage

(2) Through POD, coordinate with UOC on full recruitment of response staff

(3) Provide administrative support for the response effort via reachback

(4) Recruit additional support personnel for EOC.

d. **Northwestern Division:**

(1) Ramp up Northwest Aloha Reception Center to full operations

e. Prime Power: Deploy additional personnel, selected from all detachments.

f. USACE, General:

(1) Deploy full ESF #3 Team.

(2) Deploy Management Team for Structural Safety Assessment.

(3) Deploy Management Team for Debris Removal

(4) Deploy full PRT for Temporary Housing

5. **Phases IV and V:** Activities in this phase will be conducted under normal USACE response procedures.

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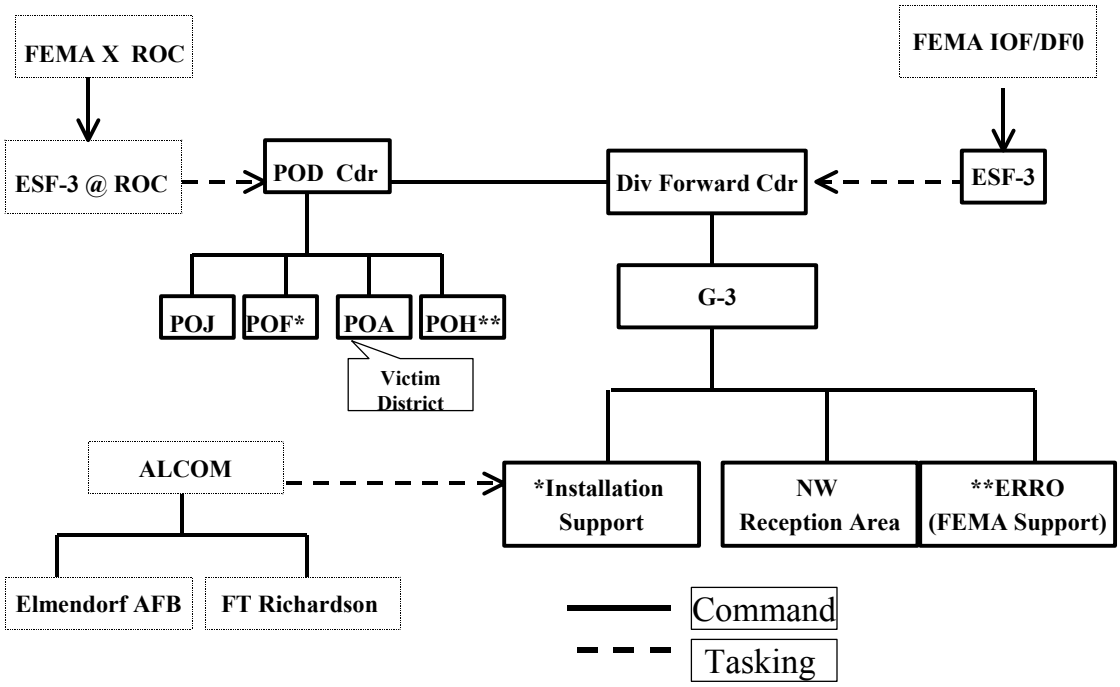
TAB A TO APPENDIX 1 TO ANNEX A TO ANCHORAGE EARTHQUAKE CDRP
POD Response Organization: Division Forward



Personnel requirements for this organization are listed in ENGLink (see Annex E, Appendix 1: Corps MOBTDA).

Note: for a lesser event, POD and its districts may establish a Division Forward Support Office, rather than a full ERRO.

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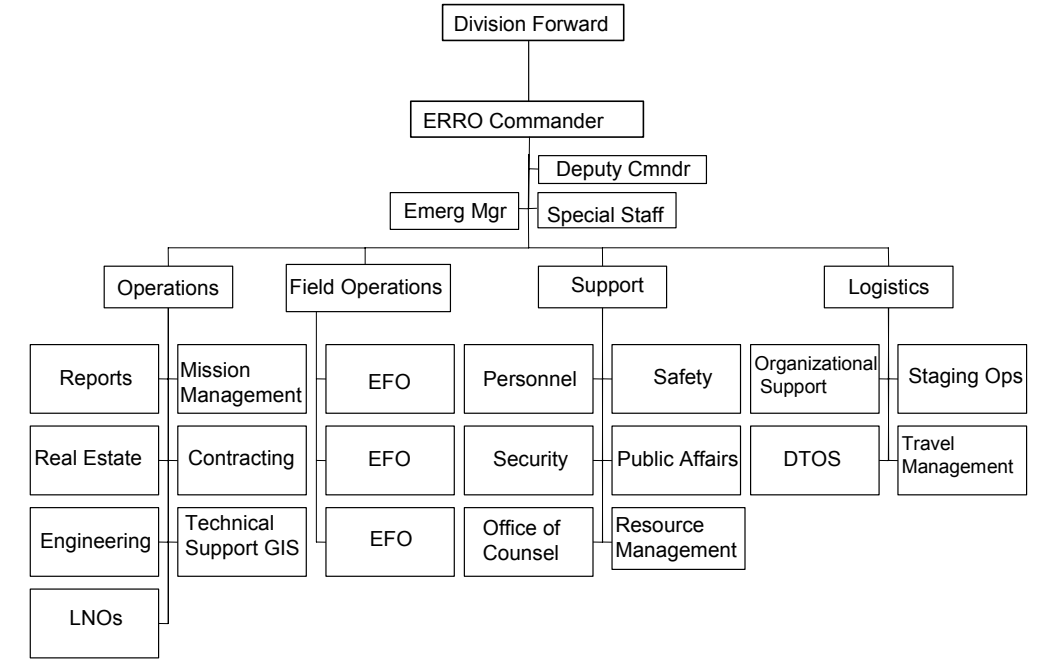
TAB B TO APPENDIX 1 TO ANNEX A TO ANCHORAGE EARTHQUAKE CDRP
POA/POH Organization: ERRO

ERRO Organization



As the replacement for the "victim district", POH will be responsible for establishing this organization. Personnel requirements are listed in Annex E, Appendix 1: Corps MOBTDA.

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APPENDIX 2 TO ANNEX A TO ANCHORAGE EARTHQUAKE CDRP
FEDERAL AGENCY RESPONSE

1. **Initial Response, Anchorage:**

a. The Federal Initial Operating Facility is colocated with the SECC, Camp Denali (Fort Richardson), Alaska.

b. Because of the potential for transportation problems in the early stages of the disaster, FEMA Region X has established the Alaska Emergency Response Team. This is an initial response team composed of Anchorage-based representatives of Federal agencies. This is described in detail in the State of Alaska Annex (Annex H, Tab AK) of the FEMA/DRR Region X Regional Response Plan.

(1) The Federal Liaison Officer (FLO) is a position unique to Alaska. Region X has acknowledged this position to provide coordination among federal agencies in Alaska during major events when such support to the State of Alaska and coordination is needed before DRR can make contact or arrive to assume its coordination role under the FRP. The FLO provides a single point of contact for the SCO and the Region X ROC for coordination with federal agencies in the response to major disaster events. After the occurrence of a major event, the FLO will report to the State SECC and will collect information about the status and capabilities of Federal agencies based in Alaska and assist the SCO in making contact with these Federal agencies.

(2) The following ESFs have local personnel, from their primary agencies, who would report to the Interim Operating Facility following the earthquake: ESF #1, Transportation; ESF #3, Public Works and Engineering; ESF #4, Firefighting (Department of Interior, not Department of Agriculture, per a special provision in the Federal Response Plan); ESF #6, Mass Care; ESF #7, Resource Support; ESF #8, Health and Medical Services; ESF #10, Hazardous Materials; ESF #11, Food (limited staffing); the Defense Coordinating Officer (DCO); and the Defense Coordinating Element (DCE).

(3) The following ESFs will initially be represented by local personnel from a support agency: ESF #2, Communications (limited staffing); ESF #5, Information and Planning; and ESF #9, Urban Search and Rescue.

(4) The following ESF has no initial representation in Anchorage: ESF #12, Energy.

(5) ESFs # 13, 14, and 15 have not yet been integrated into the Federal Initial Operating Facility planning.

(6) The Defense Coordinating Officer and Defense Coordinating Element have been pre-designated from within the ALCOM staff (on Elmendorf AFB).

(7) The above representatives of Federal agencies, working together with State personnel, will develop the initial situation assessment.

3. **Initial Response, Seattle:**

a. The Region X ROC will be activated at Bothell, WA, north of Seattle. For this type of event, the activation would be at Level 1 (the highest of the 3 designated levels). This level includes full engagement of Federal regional and national resources, including a fully staffed ROC with full representation from all Federal Response Plan (FRP) signatory agencies with Emergency Support Function (ESF) responsibilities.

b. Most ESF lead agencies have a regional headquarters in Seattle (or, for the U.S. Forest Service and USACE, in Portland, OR). In cases where an agency's Pacific Northwest region does not also include Alaska (e.g., ESF #3, ESF #4, and DCO), representatives from the Region X/Puget Sound RISC would normally provide interim representation at the ROC.

c. FEMA Region X would deploy an Emergency Response Team-Advance (ERT-A) to Anchorage as soon as transportation became available. This is especially important in the case of a catastrophic event, since the AERT personnel would be distracted by personal and agency impacts.

d. For a catastrophic event, the ERT-A would be quickly augmented by other Federal workers from the Seattle/Tacoma area, and by predesignated nationwide teams (such as the USACE PRTs). Normally this will occur within 24 to 72 hours after the ERT-A deployment.

e. An initial Disaster Field Office (DFO) would be set up at the Alaska National Guard Headquarters (Camp Denali). FEMA will immediately look for a suitable locations for a full DFO, as well as Disaster Recovery Centers to provide direct support, information, and assistance to affected citizens.

Tab A: Federal/State Joint Staffing Structure

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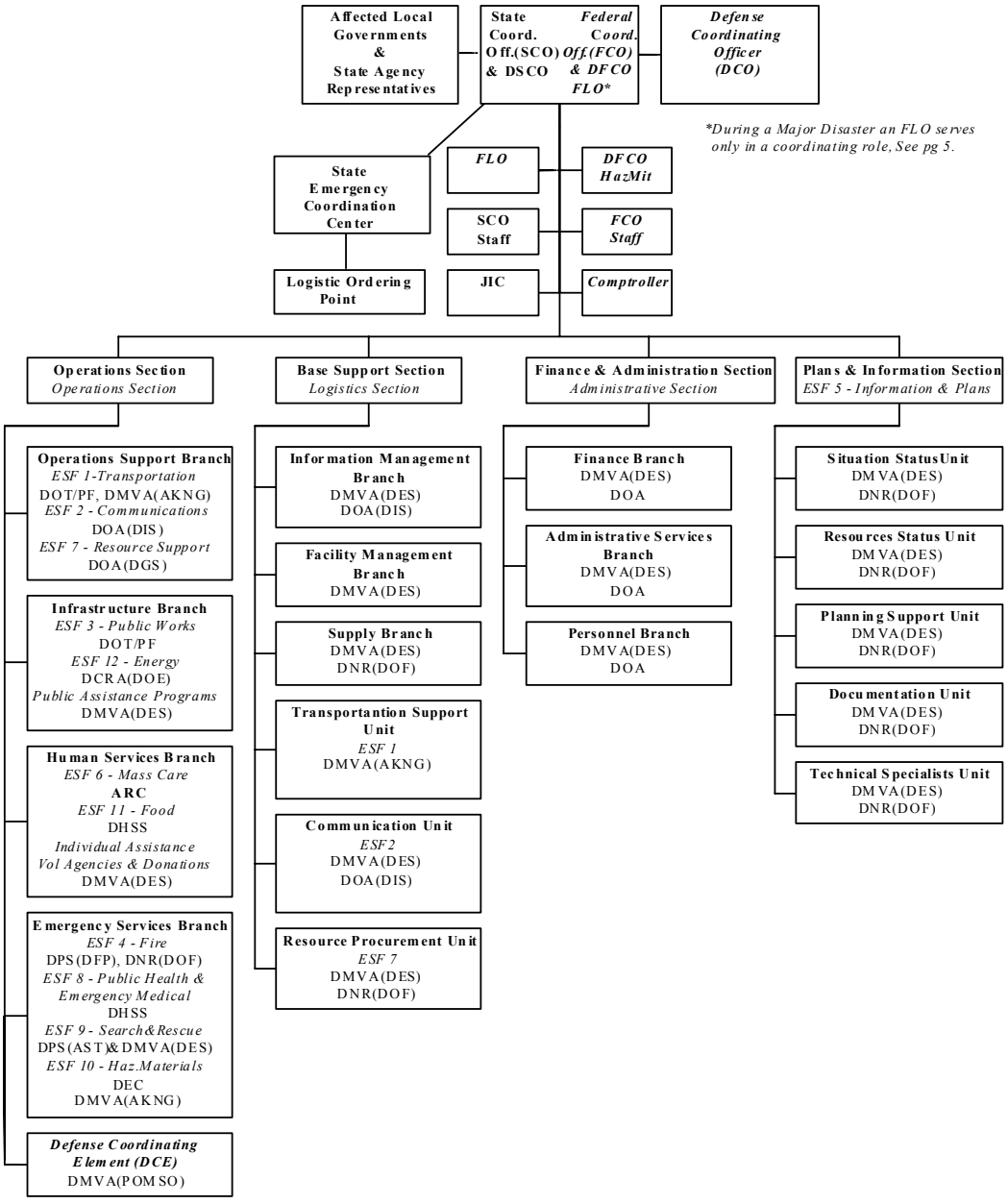
TAB A TO APPENDIX 2 TO ANNEX A TO ANCHORAGE EARTHQUAKE CDRP
SECC FEDERAL/STATE JOINT STAFFING STRUCTURE



***Initial* SECC Federal/State Joint Staffing Structure** *(Italics is federal only resource)*

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APPENDIX 3 TO ANNEX A TO ANCHORAGE EARTHQUAKE CDRP
STATE OF ALASKA RESPONSE

1. Alaska State Emergency Coordination Center (SECC) is automatically activated, at a Level 2 response, at Camp Denali, Fort Richardson, Alaska. Level 2 is the higher of the two designated levels of response in the State of Alaska plan; it involves complete staffing of the State Emergency Coordination Center (SECC), activation of all State agencies, and the anticipated activation of Federal agencies (under the AERT concept).

2. Local representatives from State agencies report to SECC. (The Alaska Department of Military and Veterans Affairs has its headquarters at Camp Denali. Most agencies have a major regional headquarters in the Anchorage area, while the primary agency headquarters is in Juneau.)

3. ADES has priority for the first block of commercial long-distance telephone circuits restored to the Anchorage area. (This includes circuits for both State and Federal operations at the SECC.)

4. When long distance service is available, ADES will set up a conference call with the Governor and the State disaster policy cabinet (the heads of the key State agencies providing response support).

5. State and Federal sections will work side by side and communicate and coordinate directly at the staff level. However, actual project authorizations will follow traditional channels:

a. Assistance funded under the Stafford Act will require a request from the State Coordinating Officer (SCO) to the Federal Coordinating Officer (FCO), and will be issued by Mission Assignment to the appropriate Federal activity.

b. Activities funded under the Alaska State Disaster Fund must be authorized by the SCO.

c. Activities funded under agency authorities (State or Federal) will be coordinated through the SCO and FCO, to insure that they do not use personnel and/or equipment resources that are needed for higher priority activities.

6. State operations are managed under the Incident Command System (ICS). For this event, the SECC will be functioning as a coordination center, arranging for support for the four primary local jurisdictions involved. (In some other areas of Alaska, the State also serves as the local government.)

7. See Annex A, Appendix 2, above for the organization of the SECC.

8. Alaska is a member of the Emergency Management Assistance Compact (EMAC), an interstate mutual aid compact that offers a quick and easy way for states to send personnel and equipment to help disaster relief efforts in other states. EMAC includes all states (except California and Hawaii), plus Puerto Rico, the Virgin Islands, and the District of Columbia. This will allow rapid mobilization of resources from other states. However, the transportation limitations will prevent receipt of such aid during the early stages of the response. Alaska also has mutual assistance agreements with adjacent areas in Canada.

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APPENDIX 4 TO ANNEX A TO ANCHORAGE EARTHQUAKE CDRP
LOCAL GOVERNMENT RESPONSE

1. Municipality of Anchorage.

a. Emergency operations will be coordinated at the Municipality EOC, located at 13th and E. The EOC has an emergency power system with 10 days fuel supply, extensive communications and computer systems, and the backup police and fire dispatch center.

b. The Municipality has a well-established ATC-20 program. Several hundred persons have been trained (to a level greater than that used in other jurisdictions) and registered to perform inspections. Many of these persons are involved in building maintenance, or are employees of engineering firms retained by the building owners. Following an earthquake, these inspectors are authorized to conduct structural safety assessments, to permit the buildings to be reoccupied.

2. Matanuska-Susitna Borough. The Emergency Management function is located in the Cottonwood Public Safety Building, at the intersection of the Palmer-Wasilla Highway and Seward Meridian Road. The main borough offices are at 300 Dahlia Avenue in Palmer. The borough and its three cities each have small public works organizations. The Borough EOC is located in the Wasilla Fire Station, West Swanson Avenue at Lucille Street. Palmer, Wasilla, and adjacent areas will probably receive moderate damage from either planning earthquake.

3. Kenai Peninsula Borough. The borough has an emergency management office, which reports to the mayor. The borough EOC is in Soldotna; a secondary EOC is located in Seward. The borough, Kenai, and Soldotna have Public Works Departments.

a. The borough would have moderate damage during a subduction earthquake. Direct damage from the shallow crustal event would be primarily along the northern portion of the Kenai Peninsula. The community most directly affected would be Hope, which is only a few miles from the fault. The fault then runs through the Kenai National Wildlife Refuge (some oil wells and production pipelines could be impacted), and crosses the Sterling Highway between Sterling and Cooper Landing. For either event, land access from the Borough to Anchorage would probably be cut.

b. The emergency response capability of the borough is quite high, as it has responded to a number of natural and technological emergencies. It uses the Community Alert Network, and will be a test site for an experimental radio-based system that will utilize GIS data to broadcast warnings to the specific areas affected by a localized emergency.

4. City of Whittier. This city is located in the Unorganized Borough, so the next level of government is the State. The city has a small public works department. The city is more capable than would be expected from its permanent population of about 300, due to its status as an active

seaport. Still, it would require assistance from the State of Alaska for any major damages. A total electrical outage is probable in Whittier; loss of regional power would also shut down the ventilation system for the road/railroad tunnel, thus stopping automobile and truck access to Whittier.

5. Local priorities immediately after the earthquake, as established by the Municipality of Anchorage, are:

a. Search and Rescue
b. Evacuation of damaged areas
c. Reuniting families
d. Opening shelters
e. Restoring electrical power and communications
f. Prioritizing ATC-20 inspection of buildings
g. Installing emergency power where commercial power cannot be quickly restored
h. Clearing and repair of emergency access routes
i. Receiving, storing, and distributing supplies/water/fuel
j. Mobilizing volunteers, food, and housing assets

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APPENDIX 5 TO ANNEX A TO ANCHORAGE EARTHQUAKE CDRP
PUBLIC UTILITIES RESPONSE

1. General. Utilities in the area will rely extensively on mutual aid assistance from outside the disaster area. However, since this event will affect about half the population of the state, most of the personnel and equipment will need to be brought in from CONUS. This will require either air delivery or several days sea/land transit time. Utility systems in Anchorage will be represented at the Municipality's EOC.

2. Electricity. Generation and distribution systems in Southcentral Alaska are owned by either governments or cooperatives, so direct Federal assistance may be utilized.

a. Anchorage Municipal Light and Power (ML&P) provides electricity in downtown and midtown Anchorage. ML&P has generating plants in East Anchorage, near the Muldoon Road/Glenn Highway intersection. This location is heavily impacted by the 7.5 shallow crustal earthquake (~0.5 g).

b. Chugach Electric Association (CEA) provides electricity in most of the Anchorage Bowl, as well as the areas along Turnagain Arm. Chugach is the largest electric co-op in Alaska, and one of the largest in the United States. A 7.5 shallow crustal earthquake on the Border Ranges fault would cause extensive damage to Chugach's distribution system in the Hillside area of Anchorage. The primary generating plant is across Cook Inlet, but emergency/peak load generators in Anchorage could be damaged. The primary transmission line includes a submarine cable system under Cook Inlet. This could be very hard to repair during the winter. It was installed by barge; ice in Cook Inlet could prevent barge operations, and winter storms in the Gulf of Alaska could prevent mobilization of the barge. The alternate supply line, around Knik Arm, is vulnerable to the 7.5 Border Ranges earthquake.

c. Matanuska Electric Association (MEA) provides electricity in the Knik Arm portion of Anchorage (Eagle River to Eklutna) as well as in the Palmer-Wasilla area. MEA is the oldest and the second largest electric co-op in Alaska. The 7.5 Border Ranges Fault earthquake would cause extensive damage to the distribution system along Knik Arm. MEA has limited generating capability, but it will be able to obtain power from Healy through the Railbelt Intertie, and from the Beluga Power Plant via the transmission line west of Knik Arm. However, transmission line damage will prevent MEA from quickly restoring power to the Eagle River/Eklutna area.

d. Homer Electric Association provides power to the western Kenai Peninsula, including Kenai and Soldotna. (Chugach Electric supplies the Northeastern portion of the peninsula, while the City of Seward has its own electrical utility.) Adequate power is available from the Bradley Lake hydropower plant, and the distribution system in this area is less vulnerable to the two potential events than is the system in Anchorage. However, some damage would occur from the 8.0 subduction earthquake.

e. Elmendorf AFB and Fort Richardson currently operate their own electrical generating plants. However, both bases plan to decommission these generators within the next few years. The Elmendorf AFB plant is to be demolished; the Fort Richardson plant will be mothballed. Reactivation of the Army power plant would take at least a day. The Fort Richardson plant has multi-fuel capability (natural gas, oil and coal).

3. Telephone. Matanuska Telephone Association, a cooperative, provides service to the Matanuska-Susitna Borough and to the Knik Arm portion of Anchorage (Eklutna to Eagle River). Private telephone companies provide service elsewhere within the impacted area. Long distance service is via fiber optic cables that run along Turnagain Arm; these cables will probably be inoperative after the earthquake. However, backup service is available via satellite.

4. Water. The Municipality of Anchorage and most cities in the region own the local water systems. However, many residents of these communities, and almost all rural residents, use private wells. About 80 percent of the water supply for the Municipality of Anchorage comes through the Eklutna Lake pipeline, which runs near the Border Ranges Fault, or is from the Ship Creek Dam, which is also near the fault. The remainder of the supply comes from various wells in the Anchorage Bowl, some of which could be damaged. The Hillside area (closest to the Border Ranges Fault) relies almost entirely on private wells.

5. Sewer. The Municipality of Anchorage and most cities in the region own the local sewer systems. However, many residents of these communities, and almost all rural residents, use private septic tanks. Within the MOA, the higher Hillside area (close to the Border Ranges Fault) relies almost entirely on septic tanks.

6. Solid Waste. The Municipality of Anchorage and the two Boroughs each have central publicly-operated landfills; collection is by a combination of public agencies and private companies. All three areas maintain transfer sites where refuse is collected for transfer to the landfills. Landfill availability is generally not a problem, although access to the landfill after an earthquake could be a problem in the Municipality of Anchorage.

7. Building heating. Most buildings in the Municipality of Anchorage and the Palmer-Wasilla area use natural gas for heating. Oil and electricity are used to some extent, and some residents use wood stoves as backup (occasionally as primary) heat sources. Natural gas comes from the Cook Inlet fields, and is transmitted through two pipelines: one around Knik Arm (running near the Border Ranges Fault) and the second underwater, near the mouth of Turnagain Arm (also very close to that fault). Elmendorf AFB currently uses steam from the central power plant for heating many of its buildings; the steam distribution lines could be damaged by an earthquake. However, Elmendorf is converting to individual building heating units, using natural gas. For most disasters, the two-pipeline arrangement results in a high probability that service will continue. However, the system is vulnerable to a large-scale earthquake—particularly one on the Border Ranges Fault, which runs parallel to, and within a few miles of, both pipelines, and has stronger shaking than the potential subduction zone event.

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ANNEX B TO ANCHORAGE EARTHQUAKE CDRP
SITUATION/INTELLIGENCE

1. **SITUATION**

a. **General**. This plan describes the USACE response to a catastrophic earthquake in the Southcentral Alaska region. To qualify as catastrophic under the Federal definition, an earthquake in this region would have to cause severe damage to Anchorage, which is the major population, commerce, and transportation center. (An earthquake in another area of Alaska could cause equally severe local damage, but the total damages would be less, and many of the assets needed for responding to the event would be available from Anchorage and from other areas of the state.) A severe earthquake in Anchorage would also cause damage to the adjacent Matanuska-Susitna and Kenai Peninsula Boroughs, and to the City of Whittier.

This region contains over half the population of Alaska. It is part of one of the most active seismic regions of the world, and has relatively severe winter conditions that can quickly kill persons who are not properly protected.

b. **Threat.** There are two potential sources of catastrophic earthquakes in the region:

(1). Anchorage is located above the inner side of the Alaska-Aleutian Megathrust Fault, a subduction fault that extends south of the Alaskan coast, from Yakutat past the tip of the Aleutian Islands, almost to the Kamchatka Peninsula in Russia. The 1964 Good Friday Earthquake, located on this fault, was the second strongest earthquake worldwide since 1900. (Two others along the same fault rank in the top 10 worldwide for that same period of time.)

(2). Because of the plate movement, Anchorage is in a "crush zone" similar to Los Angeles. This could result in a shallow crustal earthquake of up to magnitude 7.5. Such an earthquake would affect a much smaller area than a subduction earthquake, but the shaking close to the fault could be several times stronger than that produced in 1964. In addition, such an earthquake would have a relatively greater impact on shorter structures, such as residences, than would a subduction earthquake.

c. **Geography.** Anchorage is separated from other population centers. The closest support is from Fairbanks (260 air miles, 350 road miles), which has a total population of around 84,000 persons (including two major military installations, Fort Wainwright and Eielson A.F.B.). Major aid would have to come from the Pacific Northwest, over 3 hours away by air (1446 air miles from Sea-Tac) and several days away by sea or road.

d. **Climate.** Anchorage is in the border region between the maritime Gulf of Alaska region and the continental Interior Alaska region. Nighttime low temperatures below freezing are normal from the end of September until mid-April; high temperatures below freezing are normal from

late October until mid-March. Temperatures are noticeably colder in the Matanuska-Susitna (Mat-Su) Valley, as well as in certain "cold spots" within the Anchorage Bowl. See Tab C of Appendix 1 for additional climate information.

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APPENDIX 1 TO ANNEX B TO ANCHORAGE EARTHQUAKE CDRP
IMPACTED AREA SITUATION

1. **SITUATION**

a. **General**. The region has four major political subdivisions:

(1) **Anchorage** is the major population, commerce, and transportation center in Alaska. The Municipality of Anchorage is a unified home rule government, merging the original Greater Anchorage Area Borough with the Cities of Anchorage, Girdwood, and Glen Alps.

(a) The municipality extends from Girdwood on Turnagain Arm to Eklutna on Knik Arm. Most of the population is in the area from Rabbit Creek to Fort Richardson, with a secondary concentration along the east side of Knik Arm (Eagle River to Eklutna). The total land area is slightly over three times that of the City of Los Angeles.

(b) The Office of Emergency Management is part of the Public Safety Team, reporting to the Municipal Manager. The Municipality's EOC is located at 13th and E. The building survived the 1964 earthquake, and was extensively remodeled in 1999 to serve its new function. The remodeling included structural reinforcement, an emergency power system with 10 days capacity, extensive communications and computer systems, and establishment of the backup police and fire dispatch center in the basement of the EOC building.

(2) The **Matanuska-Susitna Borough** is north of Anchorage.

(a) This is a second class borough with three incorporated cities: Palmer, Wasilla, and Houston. The Palmer-Wasilla area contains the primary business district of the borough; Palmer also contains the borough government offices and the hospital. The Emergency Management function is part of the Borough Public Safety Department (note: this does not include law enforcement); the office is located at the Cottonwood Public Safety Building, at the intersection of the Palmer-Wasilla Highway and Seward Meridian Road. The EOC is located in the Wasilla fire station, West Swanson Avenue at Lucille Street. The borough and its three cities each have small public works organizations.

(b) The borough is a semi-rural area. The two largest population centers, according to the 2000 census, are the Knik-Fairview census defined place (CDP), south and southwest of Wasilla, and the Lakes CDP, northeast of Wasilla. Both areas rank in the top ten Alaska population centers, per the census. (Wasilla, the Meadow Lakes CDP northwest of Wasilla, and Palmer are also among the top 20 population centers in Alaska.) These areas would be damaged by either of the probable events, with Meadow Lakes the least impacted.

(c) About two-thirds of the borough's population lives in the Palmer-Wasilla area, but the borough extends out about a hundred miles each way along the Parks and Glenn Highways. In land area, it is the third largest local government unit in the United States; it is larger than 9 of the individual states. In population, it is the third largest borough/unified government in Alaska. (It is the fastest growing area in Alaska, and is listed in the top 50 fastest-growing "counties" by the U.S. Census Bureau.)

(3) The **Kenai Peninsula Borough** includes the Kenai Peninsula plus a small area along the west shore of Cook Inlet.

(a) This is a second class borough with six incorporated cities (Kenai, Soldotna, Seward, Homer, Kachemak City, and Seldovia); three organized Alaska Native communities (Tyonek, Port Graham, and Nanwalek), and over 20 unorganized communities. The twin cities of Kenai and Soldotna, along with the unincorporated community of Nikiski, form the major economic center of the Borough. Nikiski contains refineries and petrochemical plants. Homer and Seward are also commerce centers, and Seward (at the southern end of the Alaska Railroad) is one of the four primary seaports in mainland Alaska. In land area, it is the fifth largest local government unit in the United States; the total land area of the borough equals that of Massachusetts and New Jersey combined (larger than 9 of the individual states).

(b) The Borough offices are in Soldotna; small hospitals are located in Soldotna, Homer, and Seward. The Borough has an emergency management office, which reports to the mayor. The Borough EOC is in Soldotna; a secondary EOC is located in Seward. The Borough, Kenai, and Soldotna have Public Works Departments.

(c) Direct damage from the shallow crustal event would be primarily along the north shore of the Kenai Peninsula, in the Kenai National Wildlife Refuge. The heaviest damage would probably occur in Hope, a community of about 150 persons located on the south shore of Turnagain Arm, a few miles from the Border Ranges Fault. The fault continues across the Sterling Highway, east of Soldotna, between Sterling and Cooper Landing. In addition, some oil wells and production pipelines in the northwestern Kenai Peninsula could be impacted. Land access from the Borough to Anchorage would probably be cut.

(d) The Borough would have moderate damage during a subduction earthquake. However, there is a major concern for oil and hazardous materials spills. The impacted area contains an active oil production area, including related seaport, refinery, and petrochemical manufacturing facilities. The Kenai-Soldotna includes the majority of the hazardous materials facilities within Southcentral Alaska. Land access from the Borough to Anchorage would probably be cut.

(4) The **City of Whittier** is in the Unorganized Borough. Access is through a combined railroad-highway tunnel or by sea; the airport is only suitable for light planes. Whittier should escape major damage from either event, and the tunnel remained functional in 1964. However, the city's electrical supply would probably be cut off and the road/rail access could be blocked by avalanches. (These problems occurred during the 1999-2000 Winter Storm and Avalanche disaster.)

(5) There are several Federally recognized Alaska Native tribes in the impacted area. Unlike in the Lower 48, the "Indian country" doctrine does not apply in Alaska (outside of the Federally established Metlakatla Reservation in Southeastern Alaska) and the tribes are generally based on individual communities (40 percent of all recognized tribes are in Alaska, but each tribe is relatively small and has limited capabilities). Alaska Native organizations in the region are:

(a) General coordination statewide for tribes: Alaska Intertribal Council, 431 West 7th Avenue Suite 201, Anchorage, AK 99501

(b) Regional non-profit Alaska Native corporation: Cook Inlet Tribal Council, 670 W. Fireweed Lane, Anchorage, AK 99503, (907) 276-3343

(c) Federally recognized tribe, Municipality of Anchorage: Village of Eklutna, 26339 Eklutna Village Road, Chugiak, AK 99567, (907) 688-6020

(c) Federally recognized tribes, Matanuska-Susitna Borough:
Village of Chickaloon, P.O. Box 1105, Chickaloon, AK 99674, (907) 746-0505
Knik Village Council, P.O. Box 871565, Wasilla, AK 99687, (907) 376-2845

(c) Federally recognized tribes, Kenai Peninsula Borough:
Kenaitze Indian Tribe, P.O. Box 988, Kenai, AK 99611, (907) 283-3633
Village of Nanwalek, Homer, AK 99603, (907) 281-9219
Ninilchik Village Traditional Council, P.O. Box 39070, Ninilchik, AK 99639, (907) 567-3313
Village of Port Graham, P.O. Box PGM, Port Graham, AK 99603, (907) 284-2227,
Village of Salmantoff, P.O. Box 2682, Kenai, AK 99611, (907) 283-7864,
Village of Tyonek, P.O. Box 82009, Tyonek, AK 99682, (907) 583-2201,

b. **Demographics.** About 42% of the population of Alaska (260,283 of 626,932) lives in the Municipality of Anchorage. An additional 9% (59,322) lives in the adjacent Matanuska-Susitna Borough. (27% of the Mat-Su Borough's employed residents work in Anchorage. In addition, 5% work in the North Slope oil fields, and 5% elsewhere; both groups normally commute through Anchorage International Airport.) In addition, 8% of the state's population (49,691) lives in the Kenai Peninsula Borough. Whittier, a second class city in the Unorganized Borough, has about 300 residences.

c. **Logistics.** Anchorage serves as the primary supply point for most of Alaska. The Port of Anchorage and Anchorage International Airport are the primary ocean and air ports for the region. The Port of Anchorage handles 85% of the general cargo for the Alaska Railbelt area. Anchorage International Airport has a regional hub for Federal Express and a major United Parcel Service facility. In terms of total cargo aircraft landing weight, Anchorage International airport is the busiest air cargo port in the United States, and the sixth busiest in the world. In addition, the seaports of Whittier and Seward rely on the road and railroad routes that run through Anchorage (except for freight to the Kenai Peninsula). Port MacKenzie, a medium-draft port (-20 feet at MLLW) on the west side of Knik Arm, is in the area affected by the two planning earthquakes. (Port MacKenzie is being expanded to accommodate ocean-going

vessels.) Elsewhere in Southcentral Alaska, Seward, Whittier, Homer, and Valdez also have deep-draft commercial ports. The majority of the freight into Anchorage is shipped from the Puget Sound area, but direct shipments arrive from a variety of sources in Alaska, the Lower 48, and international locations such as Japan.

d. **Military Significance.** Anchorage is a major military center. Alaska is in a strategic location that allows rapid deployment of aircraft to both Europe and the Western Pacific Ocean. Elmendorf Air Force Base has been designated as the home of one of Air Force's ten fighter Expeditionary Aerospace Force (EAF) lead wings. Elmendorf AFB also supports Eielson AFB for aerial refueling of air transport between CONUS and eastern Asia. Fort Richardson is currently the home for one battalion of one of the Army's six Stryker Brigades, with the main portion of the brigade stationed at Fort Wainwright. However, current plans call for establishing an airborne brigade at Fort Richardson, and consolidating the Stryker brigade at Fort Wainwright. This will give Alaska two rapid-deployment brigades, and increase Fort Richardson's population by 2,000 solders above its current strength. The Port of Anchorage has been designated as one of 15 strategic ports of departure nationwide; these ports are used to support major deployments of military forces. Army personnel from Fort Wainwright and Fort Richardson rely on the Port of Anchorage for deployment of vehicles and other major items; a Joint Mobility Complex on Elmendorf A.F.B. supports the deployment of Fort Richardson's personnel and equipment by aircraft. Anchorage also provides logistical support for the Ground Missile Defense system.

e. **Geology.** Anchorage is located in a subduction zone, where the Pacific Plate is moving under the North American Plate. The area has several known local (shallow crustal) faults and is believed to have blind faults, similar to the Los Angeles area. See Tab B for further information on potential earthquake sources. As an additional concern, the volcanoes on the Western side of Cook Inlet could be triggered by an earthquake, if they were in a pre-eruptive stage at the time. (The range of this effect has been estimated at 250 km for the 7.5 shallow crustal earthquake and 750 km for the deep subduction earthquake. It only occurs if the volcano is already progressing towards an eruption, but apparently can occur some months before the eruption would have normally occurred.)

f . **Geography.** Anchorage is separated from other population centers. The closest major support is from Fairbanks, with a total population of around 82,840 persons (including two major military installations, Fort Wainwright and Eielson A.F.B.). Major aid would have to come from the Pacific Northwest, over 3 hours away by air and several days away by sea or road. Access between the Matanuska-Susitna Borough and downtown Anchorage requires crossing the Matanuska River, the Knik River, Peters Creek, Eagle River, and Ship Creek. In addition, the Glenn Highway overpass over the Alaska Railroad at Eklutna does not have an existing bypass, and the junction of the Old and New Glenn Highways has limited bypass via the on/off ramps. All river crossings have at least 3 existing highway bridges, and Peters Creek, Eagle River, and Ship Creek each have at least one short, low-level crossing where a bridge could be quickly replaced. Land access between Anchorage and the Kenai Peninsula is via the Seward Highway and the Alaska Railroad, along the northern shore of Turnagain Arm. These routes cross several avalanche chutes, as well as many areas of unstable foundation. The Turnagain Arm

transportation corridor crosses the Border Ranges Fault, while the Knik Arm corridor runs within a few miles of that fault.

g. **Climate.** Anchorage is in the border region between the maritime Gulf of Alaska region and the continental Interior Alaska region. Nighttime low temperatures below freezing are normal from the end of September until mid-April; high temperatures below freezing are normal from late October until mid-March. Temperatures are noticeably colder in the Matanuska-Susitna (Mat-Su) Valley, as well as in certain "cold spots" within the Anchorage Bowl. The City of Whittier and the populated areas in the Kenai Peninsula Borough have a milder climate due to a greater "maritime climate" influence. The upper Turnagain Arm area and Turnagain Pass on the Kenai Peninsula are known for heavy annual snowfalls, and avalanches are often a problem. Strong winds are also common along Turnagain Arm and in the Hillside area of Anchorage.

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TAB A TO APPENDIX 1 TO ANNEX B TO ANCHORAGE EARTHQUAKE CDRP
GENERAL

1. **GENERAL SITUATION**. As noted below, there are two major threats to Anchorage. Because of the variations in types and areas of damages, the regional descriptions and projected damages are listed separately. Because both would have major impacts on the same areas of Anchorage, response capabilities are the same unless otherwise noted.

2. **THREAT**. Anchorage is located above the inner side of the Alaska-Aleutian Megathrust Fault, a subduction fault that extends south of the Alaskan coast, from Yakutat past the tip of the Aleutian Islands, almost to the Kamchatka Peninsula in Russia.

a. The Alaska-Aleutian Megathrust Fault is formed by the Pacific Plate subducting under the North American Plate. At approximately Yakutat, the plate boundary becomes the Fairweather Fault, a transform fault. (Some Alaskan geologists maintain that the San Andreas Fault is the southern extension of the Fairweather Fault.) This region, including the Denali Fault (which branches off the Fairweather Fault and runs through Interior Alaska), is the location for the eight strongest earthquakes in the United States since 1900, including three of the ten strongest earthquakes in the world since 1900.

b. The 1964 Alaska Good Friday Earthquake, moment magnitude 9.2, was the second strongest recorded worldwide since 1900. This earthquake was located on a portion of the megathrust fault east of Anchorage Subsequent research has established that such an earthquake involves at least 500 years of energy storage on the fault. However, two major current threats exist.

c. Because of the plate movement, Anchorage is in a “crush zone” similar to Los Angeles. This could result in a shallow crustal earthquake of up to magnitude 7.5. Such an earthquake would affect a much smaller area than a subduction earthquake, but the shaking close to the fault would be several times stronger than that produced in 1964. In addition, such an earthquake would have a relatively greater impact on shorter structures, such as residences, than would a subduction earthquake.

d. The portion of the megathrust fault directly under Anchorage could rupture, producing an earthquake of up to magnitude 8.0. This portion of the fault remained locked during the 1964 earthquake. The shaking from this earthquake would be less violent than that from a shallow crustal earthquake. The shaking would be similar in intensity to that in 1964, but with a shorter duration, and it would have a relatively greater impact on taller structures when compared to the 7.5 shallow crustal earthquake. The rupture zone is estimated at 200 km by 45 km, with the long axis roughly paralleling Knik Arm. Depending on the exact location of the fault rupture, the zone of greatest shaking would extend into the Matanuska-Susitna Borough and/or the Kenai Peninsula Borough.

3. **IMPACTED AREAS**.

a. The 7.5 shallow crustal earthquake would be on a fault that is primarily within the Municipality of Anchorage. If it were to occur on the Border Ranges fault, the northeastern end would be within the MOA, while the southwestern end would be in a very lightly developed area on the Kenai Peninsula. (However, the small community of Hope, on the south shore of Turnagain Arm, is within a few miles of the fault.) Moderate damage would occur in the Palmer-Wasilla area; impacts to the Kenai Peninsula Borough and to Whittier would be primarily due to damage to access routes along Turnagain Arm.

b. The 8.0 subduction earthquake would involve a rupture zone approximately 200 x 45 kilometers. The position in regard to northwest-southeast location is fairly certain, as it is limited by fault characteristics. The position is less certain in regard to the northeast-southwest location. The location selected for developing this plan would cause impacts to both the Palmer-Wasilla and Kenai-Soldotna areas. An earthquake located further southwest on the fault would have greater impact on the Kenai Peninsula Borough, but less impact on the Matanuska-Susitna Borough. Any location involving the fault area under Anchorage would also involve the road and rail access corridor along Turnagain Arm.

4. **ADDITIONAL CONCERNS**.

a. Recent research has indicated that the 26 April 1933 magnitude 6.9 (or 7.0) earthquake, previously attributed to the Castle Mountain Fault, was actually caused by a fault beneath a fold in Cook Inlet, near the mouth of the Susitna River, about 25 miles from Anchorage. Such an earthquake, if it occurred on a fault closer to Anchorage, would cause similar damages to the 7.5 Border Ranges earthquake, with perhaps more damage to the Port of Anchorage and to Elmendorf AFB, and less damage to Hillside.

b. Research has determined that a volcanic eruption can be triggered by a major earthquake in the area. This only occurs if a volcano is already active; however, this may be possible for several months prior to when the volcano would otherwise have erupted. The range of this effect has been estimated at 250 km for the 7.5 shallow crustal earthquake and 750 km for the deep subduction earthquake. (Mount Spurr and Mount Redoubt are within 250 km; Mount St. Augustine is borderline at 290 km from Anchorage. However, the 750 km range includes the Katmai area and the highly active Veniaminof Volcano, on the Alaska Peninsula.)

The Alaskan volcanoes produce large ash clouds, which can damage aircraft engines. This would limit the transport of response personnel and supplies to the earthquake area. An ashfall in the Anchorage area would also cause problems for vehicle and generator engines. Due to the very low probability, ashfall is not included in the basic response plan.

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EXHIBIT 1 TO TAB A TO APPENDIX 1 TO ANNEX B TO ANCHORAGE EARTHQUAKE CDRP
REGIONAL DESCRIPTION, 7.5 SHALLOW CRUSTAL EVENT

HAZUS is a regional earthquake loss estimation model that was developed by the Federal Emergency Management Agency and the National Institute of Building Sciences. The primary purpose of HAZUS is to provide a methodology and software application to develop earthquake losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from earthquakes and to prepare for emergency response and recovery. The following is the background information used to develop the damage estimates for the 7.5 shallow crustal earthquake:

The geographical size of the region is 1,960 square miles and it contains 56 census tracts. There are over 83,000 households in the region and a total population of 226,300 people (1990 Census Bureau data).

There are an estimated 60,000 buildings in the region with a total building replacement value (excluding contents) of 15.166 billion dollars (1994 dollars). Approximately 96% of the buildings (and 76% of the building value) are associated with residential housing.

The replacement values of the transportation and utility lifeline systems are estimated to be 2.693 billion dollars and 0 dollars (1994 dollars), respectively.

Building and Lifeline Inventory

Building Inventory

HAZUS estimates that there are 60,000 buildings in the region which have an aggregate total replacement value of 15.166 billion dollars (1994 dollars). Table 1 presents the relative distribution of the value with respect to the general occupancies.

Table 1
Building Exposure by Occupancy Type

		Building Value (millions of dollars)		
Locality Name	Population	Residential	Non-Residential	Total
Anchorage	226,338	11,451	3,716	15,166

In terms of building construction types found in the region, wood frame construction makes up 84% of the building inventory. The remaining percentage is distributed between the other general building types.

Critical Facility Inventory

HAZUS breaks critical facilities into two groups: essential facilities and high potential loss (HPL) facilities. Essential facilities include hospitals, medical clinics, schools, fire stations, police stations and emergency operations facilities. High potential loss facilities include

dams, levees, military installations, nuclear power plants and hazardous material sites.

For essential facilities, there are 7 hospitals in the region with a total bed capacity of 808 beds. There are 168 schools, 7 fire stations, 5 police stations and 1 emergency operation facility. With respect to HPL facilities, there are 7 dams identified within the region. Of these, 1 of the dams is classified as 'high hazard'. The inventory also includes 3 hazardous material sites, 2 military installations and 0 nuclear power plants.

Transportation and Utility Lifeline Inventory

Within HAZUS, the lifeline inventory is divided between transportation and utility lifeline systems. There are seven transportation systems that include highways, railways, light rail (no systems in the area), bus, ports, ferry and airports. There are six utility systems that include potable water, wastewater, natural gas, crude & refined oil, electric power and communications. The lifeline inventory data is provided in Tables 2 and 3.

The total value of the lifeline inventory is over 0 million dollars. This inventory includes over 133 kilometers of highways, 143 bridges, and 0 kilometers of pipes.

Table 2: Transportation System Lifeline Inventory

System	Component	# Locations/ # Segments	Replacement value (millions of dollars)
Highways	Major Roads	12	1,334
	Bridges	143	179
	Tunnels	0	0
	Subtotal		1,513
Railways	Rail Tracks	53	292
	Bridges	0	0
	Tunnels	0	0
	Facilities	1	3
	Subtotal		295
Bus	Facilities	0	0
Ferry	Facilities	0	0
Port	Facilities	2	3
Airport	Facilities	22	125
	Runways	27	756
	Subtotal		881
	Total		2,693

Table 3: Utility System Lifeline inventory

System	Component	# Locations / Segments	Replacement value (millions of $)
Potable Water	Pipelines	0	0.00
	Facilities	0	0.00
	Distribution Lines	NA	0.00
		Subtotal	0.00
Waste Water	Pipelines	0	0.00
	Facilities	1	0.00
	Distribution Lines	NA	0.00
		Subtotal	0.00
Natural Gas	Pipelines	0	0.00
	Facilities	2	0.00
	Distribution Lines	NA	0.00
		Subtotal	0.00
Oil Systems	Pipelines	0	0.00
	Facilities	6	0.00
		Subtotal	0.00
Electrical Power	Facilities	12	0.00
	Distribution Lines	NA	0.00
		Subtotal	0.00
Communication	Facilities	53	0.00
	Distribution Lines	NA	0.00
		Subtotal	0.00
		Total	0.00

EXHIBIT 2 TO TAB A TO APPENDIX 1 TO ANNEX B TO ANCHORAGE EARTHQUAKE CDRP
REGIONAL DESCRIPTION, 8.0 SUBDUCTION EVENT

HAZUS is a regional earthquake loss estimation model that was developed by the Federal Emergency Management Agency and the National Institute of Building Sciences. The primary purpose of HAZUS is to provide a methodology and software application to develop earthquake losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from earthquakes and to prepare for emergency response and recovery. The following is the background information used to develop the damage estimates for the 8.0 subduction earthquake:

The area involved consists of the Municipality of Anchorage plus portions of the Matanuska-Susitna and Kenai Peninsula Boroughs. The HAZUS model did not include damage to the City of Whittier, which is in the Unorganized Borough; however, some damage is possible there as Whittier is near the rupture zone.

The geographical size of the region is 48,833 square miles and contains 91 census tracts. There are over 111,000 households in the region and a total population of 306,800 people (1990 Census Bureau data).

There are an estimated 96,000 buildings in the region with a total building replacement value (excluding contents) of 20.857 billion dollars (1994 dollars). Approximately 97% of the buildings (and 78% of the building value) are associated with residential housing.

The replacement values of the transportation and utility lifeline systems are estimated to be 15.873 billion dollars and 0 dollars (1994 dollars), respectively.

Building and Lifeline Inventory

Building Inventory

HAZUS estimates that there are 96,000 buildings in the region which have an aggregate total replacement value of 20.857 billion dollars (1994 dollars). Table 1 presents the relative distribution of the value with respect to the general occupancies.

Building Exposure by Occupancy Type

		Building Value (millions of dollars)		
Locality Name	Population	Residential	Non-Residential	Total
Anchorage	226,300	11,450	3,720	15,170
Kenai Peninsula	40,800	2,340	550	2,890
Matanuska-Susitna	39,700	2,550	250	2,800
Alaska impacted:	306,800	16,340	4,510	20,860

In terms of building construction types found in the region, wood frame construction makes up 85% of the building inventory. The remaining percentage is distributed between the other general building types.

Critical Facility Inventory

HAZUS breaks critical facilities into two groups: essential facilities and high potential loss (HPL) facilities. Essential facilities include hospitals, medical clinics, schools, fire stations, police stations and emergency operations facilities. High potential loss facilities include dams, levees, military installations, nuclear power plants and hazardous material sites.

For essential facilities, there are 13 hospitals in the region with a total bed capacity of 983 beds. There are 264 schools, 17 fire stations, 10 police stations and 3 emergency operations facilities. With respect to HPL facilities, there are 7 dams identified within the region. Of these, 1 of the dams is classified as 'high hazard'. The inventory also includes 3 hazardous material sites, 2 military installations and 0 nuclear power plants.

Transportation and Utility Lifeline Inventory

Within HAZUS, the lifeline inventory is divided between transportation and utility lifeline systems. There are seven (7) transportation systems that include highways, railways, light rail (no systems in the area), bus, ports, ferry and airports. There are six (6) utility systems that include potable water, wastewater, natural gas, crude & refined oil, electric power and communications. The lifeline inventory data is provided in Tables 2 and 3.

The total value of the lifeline inventory is over 0 million dollars. This inventory includes over 133 kilometers of highways, 143 bridges, 0 kilometers of pipes.

Table 2: Transportation System Lifeline Inventory

System	Component	# Locations/ # Segments	Replacement value (millions of dollars)
Highways	Major Roads	32	10,181
	Bridges	291	403
	Tunnels	0	0
	Subtotal		10,584
Railways	Rail Tracks	64	677
	Bridges	0	0
	Tunnels	0	0
	Facilities	4	12
	Subtotal		689
Bus	Facilities	0	0
Ferry	Facilities	0	0
Port	Facilities	9	14
Airport	Facilities	120	834
	Runways	134	3,752
	Subtotal		4,586
	Total		15,873

Table 3: Utility System Lifeline inventory

System	Component	# Locations / Segments	Replacement value (millions of $)
Potable Water	Pipelines	0	0.00
	Facilities	0	0.00
	Distribution Lines	NA	0.00
		Subtotal	0.00
Waste Water	Pipelines	0	0.00
	Facilities	0	0.00
	Distribution Lines	NA	0.00
		Subtotal	0.00
Natural Gas	Pipelines	0	0.00
	Facilities	1	0.00
	Distribution Lines	NA	0.00
		Subtotal	0.00
Oil Systems	Pipelines	5	0.00
	Facilities	12	0.00
		Subtotal	0.00
Electrical Power	Facilities	5	0.00
	Distribution Lines	NA	0.00
		Subtotal	0.00
Communication	Facilities	118	0.00
	Distribution Lines	NA	0.00
		Subtotal	0.00
		Total	0.00

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TAB B TO APPENDIX 1 TO ANNEX B TO ANCHORAGE EARTHQUAKE CDRP
MAXIMUM CREDIBLE PLANNING EARTHQUAKE

1. **Background.** Earthquake planning for Anchorage has traditionally been based on a repeat of the 1964 Good Friday Earthquake. However, in recent years scientists have made breakthroughs in understanding plate boundary earthquakes. The 1964 earthquake is now believed to represent approximately 500 years of energy storage along the plate interface, so this particular scenario is not a current threat. The Castle Mountain Fault, on the west side of Cook Inlet, has also been used in local earthquake exercises. However, the primary impacts from the Castle Mountain Fault would be in the Matanuska-Susitna Borough; because of the distance from the fault, Anchorage would have only moderate damage.

2. **AREST Study.** In 1996, the Alaska Regional Interagency Steering Committee (RISC) organized the Alaska RISC Earthquake Scenario Team (AREST) to develop a realistic earthquake threat assessment for the Anchorage area. On 29 May, 1997, the AREST met with Alaskan geologists and geophysicists at the University of Alaska Geophysical Institute in Fairbanks. At that meeting, scientists and planners verified that the 1964 scenario was not a short-term threat, and also determined that the Castle Mountain Fault was too far from Anchorage to produce a catastrophic event. However, two potential earthquakes, listed below, were identified as serious near-term threats to Anchorage. The AREST report is included as Exhibit 1, below.

3. **Maximum Credible Planning Earthquakes.** The following two scenarios were identified as having the potential to cause a catastrophic earthquake in Anchorage in the near future:

a. Shallow Crustal Earthquake: Magnitude 7.5. This could be on the Border Ranges Fault, which runs through the Hillside, Eagle River, and Chugiak areas of Anchorage; it could also be on an unknown fault, similar to those involved at Northridge and Kobe. This would produce severe damage in areas close to the fault. Due to the orientation of the local fault systems, such an earthquake could cause severe damage to almost all of the utility and land transportation systems that come into Anchorage. The projected damages (based on the Border Ranges Fault) are described in Exhibit 1 to Tab A to Appendix 2, below.

b. Alaska-Aleutians Megathrust Fault: Magnitude 8.0, involving the portion of the plate boundary west of the 1964 event, and east of the Cook Inlet volcanic axis. This area did not release in 1964, and it includes the portion of the plate boundary that is directly under Anchorage. The only recorded major earthquake in Alaska that appears to be similar to this event occurred in 1948 in the Shumagin Island area, but two earthquakes greater than magnitude 8 and deeper than 100 kilometers have been reported in the Andes. The peak acceleration would be less than for a shallow crustal earthquake, but the duration would be longer (90 to 120 seconds) and the impacted area would be much greater. In addition to the Municipality of Anchorage, this earthquake would produce major damage in the Matanuska-Susitna Borough, the Kenai

Peninsula Borough, and possibly the City of Whittier in the Unorganized Borough. The projected damages are described in Exhibit 2 to Tab A to Appendix 2, below.

4. **Associated Risks.**

a. Tsunamis. Both events were determined to be unlikely to produce a Tsunami, due to the shallow water in the impacted areas.

b. Avalanches/Landslides. These are probable, especially between Anchorage and the Kenai Peninsula. The Seward Highway and the Alaska Railroad are often blocked by avalanches during the winter, and the avalanche situation was so severe in Southcentral Alaska during the 1999-2000 winter that it resulted in a Federal major disaster declaration.

c. Plumbing damage. During the winter, extended natural gas and/or electrical outages will result in frozen pipes in residences and commercial buildings. Partial repairs will be needed to allow normal use of the buildings. Several buildings in Anchorage had water damage due to frozen pipes during power outages in the March 2003 windstorm, even though the outages lasted only a few hours. In December, 1975, a power plant fire in the Southwestern Alaska city of Bethel caused freezing damage in almost every building that had water and/or sewer service, resulting in a Federal major disaster declaration.

5. **Limitations on damage predictions.** The default data included with HAZUS does not adequately portray the local situation. While the Municipality of Anchorage has been updating the data base, and the Alaska District updated records on about 450 buildings during a training program in 2000, there are still major gaps. For example, the data does not include electrical and natural gas lines, and two of the four major hospitals in Anchorage have moved into new buildings in the past few years. Local planners believe that HAZUS is under-estimating damages to highways, railways, ports, and airports/runways, as well as over-estimating damage to water, waste water, natural gas, electric power, oil, and communications systems.

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EXHIBIT 1 TO TAB B TO APPENDIX 1 TO ANNEX B TO ANCHORAGE EARTHQUAKE CDRP
AREST REPORT

Alaska RISC Earthquake Scenario Team (AREST)

Purpose

This document describes the "maximum credible" planning earthquakes that will serve as the foundation for two Alaska Regional Interagency Steering Committee (RISC) earthquake response planning scenarios. To achieve scientific consensus on these earthquake descriptions, the Alaska RISC Earthquake Scenario Team *(AREST)* met with Alaskan geologists and geophysicists on May 29, 1997 at the University of Alaska Geophysical Institute in Fairbanks. At that meeting, AREST members and the scientists agreed on two different earthquake events as described below in Table 1.

For the next step of the scenario development, the AREST will provide these earthquake descriptions to technical experts, such as engineers, to define damages most likely to occur. Based on these damages, the AREST will then prepare 2 scenarios designed to test capabilities, plans, resource identification, staging, mass care facilities, and other elements of Federal and State disaster response.

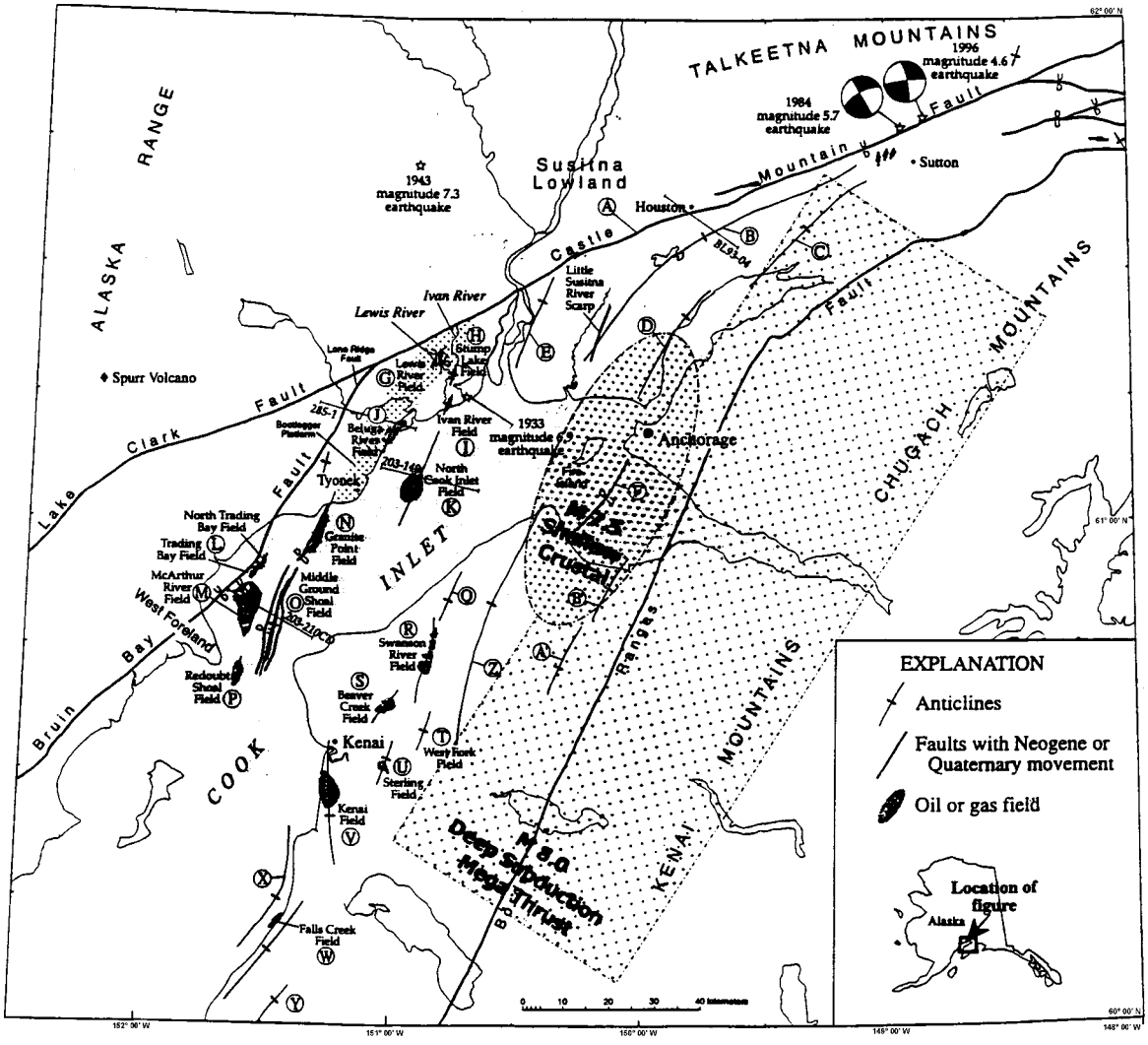
Table 1

Maximum Credible Planning Earthquakes: Anchorage Area
(Likely to occur within 50 years)

	EQ #1	EQ #2
Magnitude	M 7.5	M 8.0
Description	Shallow Crustal	Deep Subduction Mega Thrust
Location *(See Figure 1)*	Near Anchorage	Upper Cook Inlet
Depth	3-15 km	40-50 km
Peak Acceleration	0.8g	0.2g
Duration	~40-50 seconds	1 ½-2 minutes
Characteristics	Sudden jolt, then high frequency shaking 1 – 10 cycles/second (1-10 motions/second) 1-10 Hz	Continuous rolling motion 2-5 seconds/cycle (0.2-0.5 motions/second) 0.2-0.5 Hz
Rupture Area	70 x 20 km	200 x 45 km
Secondary Hazards	Land slides Snow avalanches Submarine landslides	Land slides Snow avalanches Submarine landslide
Local Tsunamis	not likely due to shallow water	not likely due to shallow water

Disclaimer: *The earthquakes described here are intended to be used as the foundation for Federal and State response planning. The descriptions provide insufficient data to support any other application.*

Figure 1.
General Areas of Planning Earthquakes



(Haeussler et al.)

Seismic Sources

The Alaska RISC recognizes that Anchorage is not the only Alaskan city in danger of severe earthquakes -- Alaska's location along the Ring of Fire puts the majority of Alaskan communities at risk. The RISC group decided to focus first on the Anchorage and coastal communities because of the large population base and complex problems associated with earthquake response in coastal communities.

As indicated in the *Anchorage Earthquake Sources* table below, Anchorage's earthquake threat is not limited to a single source -- in fact, the greatest threat may be from an unidentified fault. Anchorage is potentially as at risk from a shallow crustal quake as from a larger magnitude subduction earthquake like the 1964 event. Both earthquake types could generate damage sufficient to overwhelm local and state response capabilities. Consequently, the geologists and geophysicists recommended defining two different planning events.

These two "maximum credible" planning earthquakes should be discussed in the larger context of Alaska's immense geological picture. The descriptions should illustrate the seismic consequences of the Pacific plate thrusting under the North American plate. That tectonic activity drives all of the other Alaska mechanisms, including the Castle Mountain Fault, the Border Ranges Fault, the Denali Fault, the strike slip faults in Southeast Alaska, and many others (see Figure 2). It would be negligent to focus on one specific fault when we don't know if Alaska's next damaging earthquake will originate from an unknown fault, a fault previously considered inactive, a known fault, or from the subduction zone.

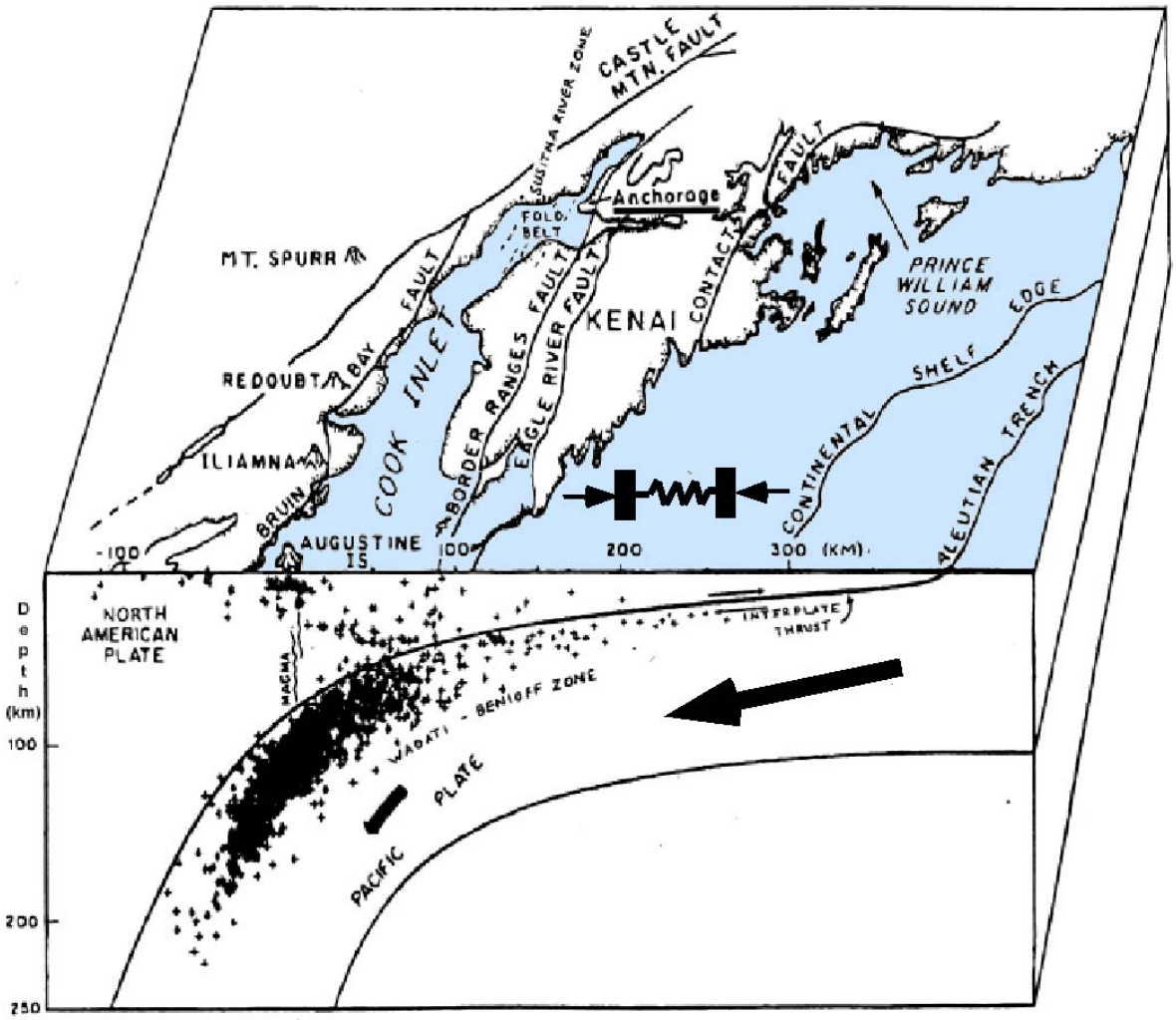
Table 2

Anchorage Earthquake Sources

(Modified from Combellick and Lahr, 1996)

	Maximum Magnitude	Closest Distance to Rupture	Average Return Period
INTERPLATE THRUST			
Shallower than ~20 km	9¼-9½	75 km	600-800 yr
Deeper than ~20 km	8	40-50 km	Unknown
SUBDUCTED PLATE	7-7½	>40 km	Unknown
OVERRIDING PLATE			
Border Ranges fault	7½?	<10 km	>10,000 yr?
N. Cook Inlet fold belt	7?	<10 km	Unknown
Castle Mountain fault	7½-7¾	40 km	1,000 yr?
Susitna River zone	7½	60 km	Unknown
Volcanic axis	6	130 km	Unknown
Other sources	7½	<10 km	Unknown

Figure 2.
Anchorage Seismic Sources
(Combellick & Lahr)



Glossary to Table of Anchorage Earthquake Sources

average return period – the average time interval between earthquakes of maximum magnitude, estimated from seismological and geological data.

interplate thrust – fault contact along which the Pacific plate slides beneath the North American plate.

magnitude – a measure of earthquake size, determined from recorded ground motion and corrected for distance to the event. Common types of magnitude are local (M_L), body wave (m_b), surface wave (M_s), and moment (M_w). As a rule of thumb, the energy released by an earthquake increases by a factor of 32 for each unit increase in magnitude. For example, a magnitude 9 event releases 32 times more energy than a magnitude 8 event.

maximum magnitude – magnitude of the largest earthquake that might reasonably be expected to occur on each source.

N. Cook Inlet fold belt – a zone of folded and faulted rocks in the North American plate which may be the source of a band of shallow earthquakes beneath northern Cook Inlet.

other sources – allows for unknown sources that may be buried or are as yet undiscovered.

overriding plate – Rock material of the North American plate, which is seismogenic from the surface to about 35 km depth.

subducted plate – portion of the Pacific plate that has been thrust beneath the North American plate and continues downward into the mantle, reaching ~100 km below the Aleutian volcanoes. Many earthquakes occur within this plate, creating a pattern of seismicity known as the Wadati-Benioff zone.

Susitna River zone – a diffuse zone of shallow seismicity that extends northward from Cook Inlet to the Alaska Range.

volcanic axis – shallow seismicity associated with the Aleutian volcanic arc, which extends northeastward as far as Mt. Spurr.

Reference

Combellick, R.A., and Lahr, J.C., 1996, Earthquake potential and hazards in southcentral Alaska [abs.]: Geological Society of America Abstracts with Programs, v. 28, no. 5, p. 56-57.

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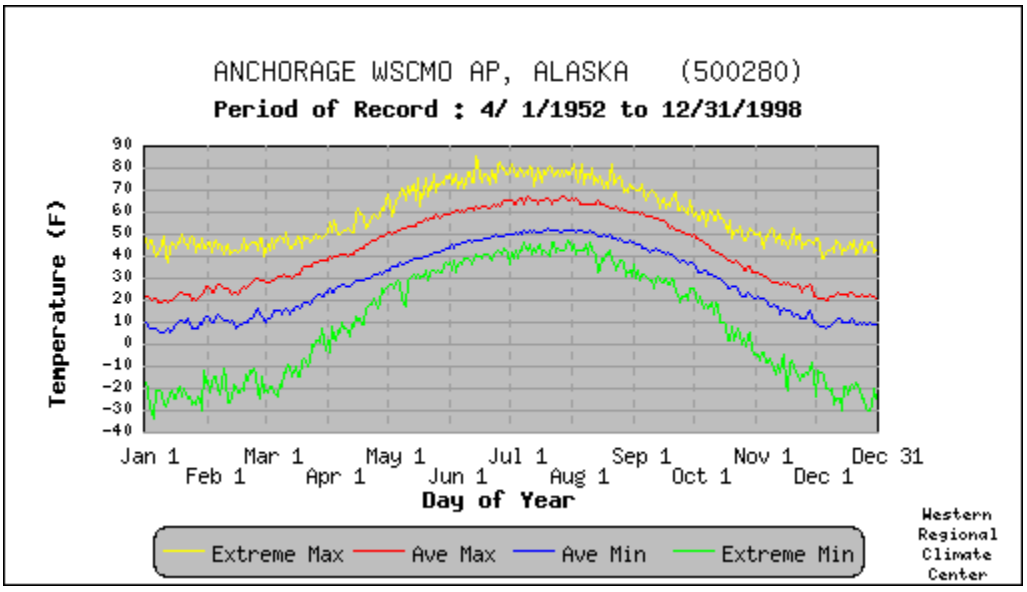
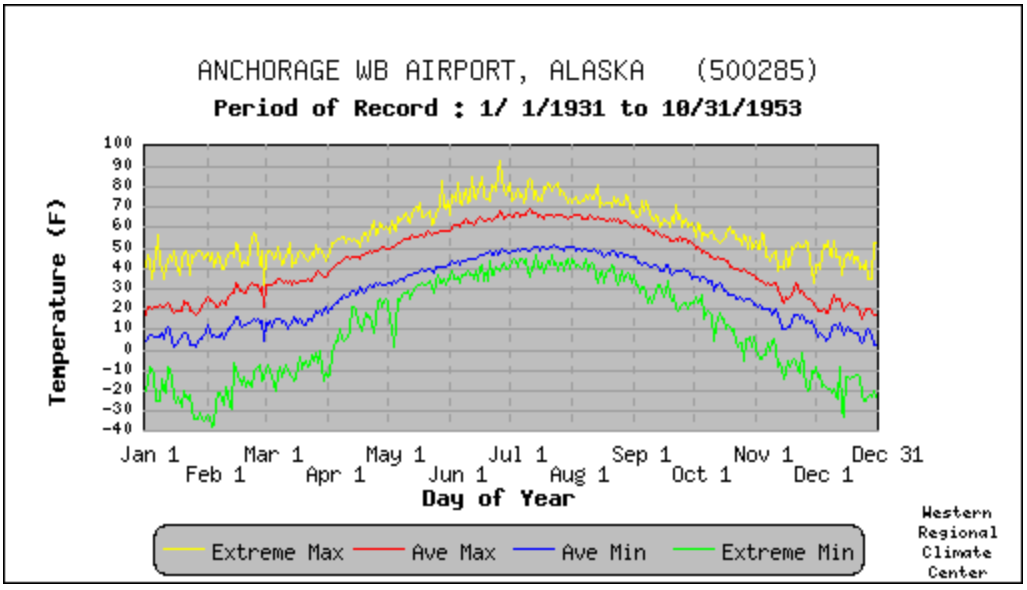
♥ Thanks to Dale Kloes of FEMA Region 10 for facilitating the Fairbanks meeting and for his contributions to this document – J.R.

TAB C TO APPENDIX 1 TO ANNEX B TO ANCHORAGE EARTHQUAKE CDRP
CLIMATE

Daily Extreme Temperatures—Current Weather Station



Daily Extreme Temperatures—Prior Weather Station



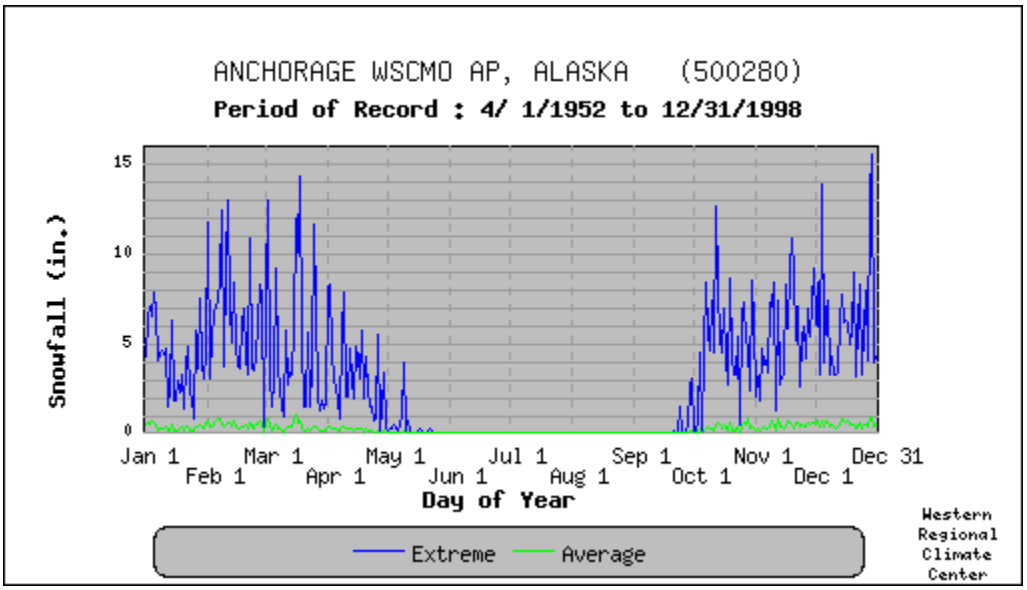
MINIMUM DAILY TEMPERATURES, ANCHORAGE, 1952-1999

	DEC	JAN	FEB
MAX	32.81	27.58	26.93
MEAN	28.91	8.03	11.07
MIN	-7.35	-4.71	-5.00
RECORD	-30	-34	-26

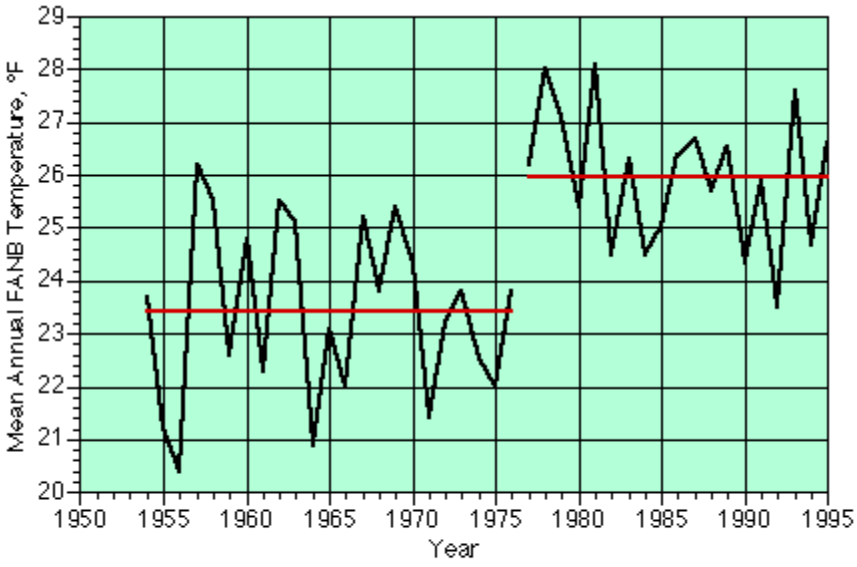
MINIMUM DAILY TEMPERATURES, ANCHORAGE WB, 1931-1953

	DEC	JAN	FEB
MAX	19.26	19.42	25.43
MEAN	7.62	5.41	10.89
MIN	-7.26	-10.39	-5.25
RECORD	-33	-35	-38

(Station was further from Cook Inlet)



Daily Snowfall—Current Weather Station



Mean Annual Temperature, average of Fairbanks, Anchorage, Nome and Barrow, Alaska. Red horizontal lines are averages for 1954-76 and 1977-95.

Note the major increase in temperatures in the 1975-76 time frame. Many meteorologists believe this change is due to a long-term (40+ year) cycle. A similar warm period occurred in the 1934 through 1944 time frame. A return to colder temperatures, during the next 10 or 15 years, would intensify the effects of utilities outages following an earthquake in the Anchorage area.

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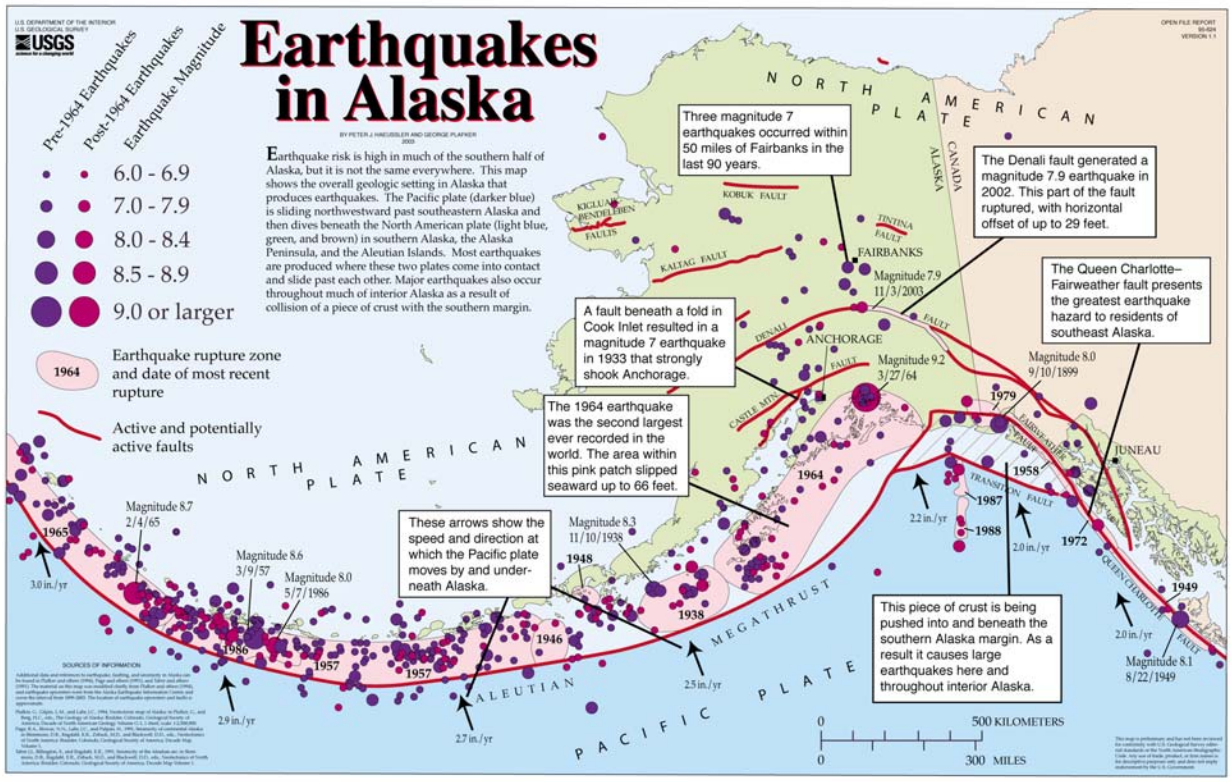
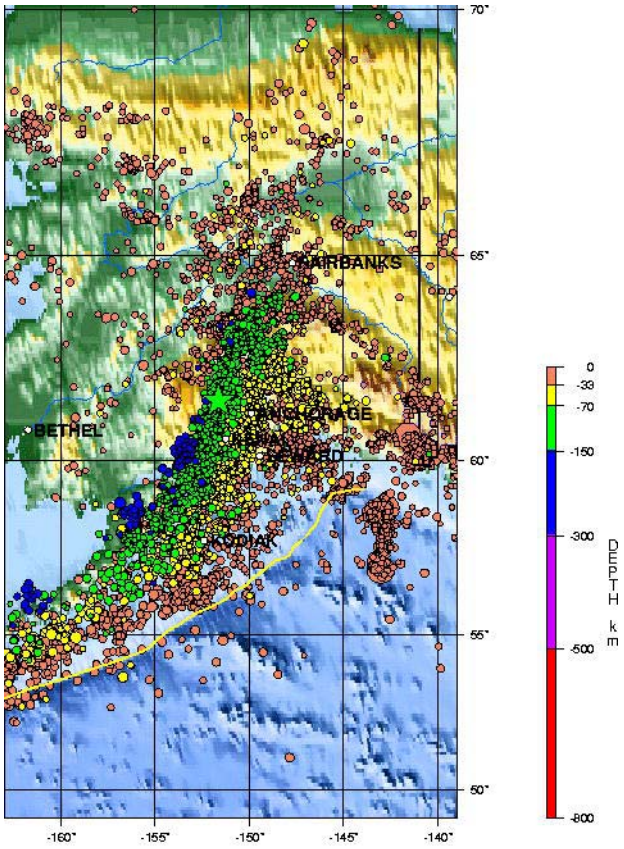
TAB D TO APPENDIX 1 TO ANNEX B TO ANCHORAGE EARTHQUAKE CDRP
MAPS

Seismic zones in Alaska

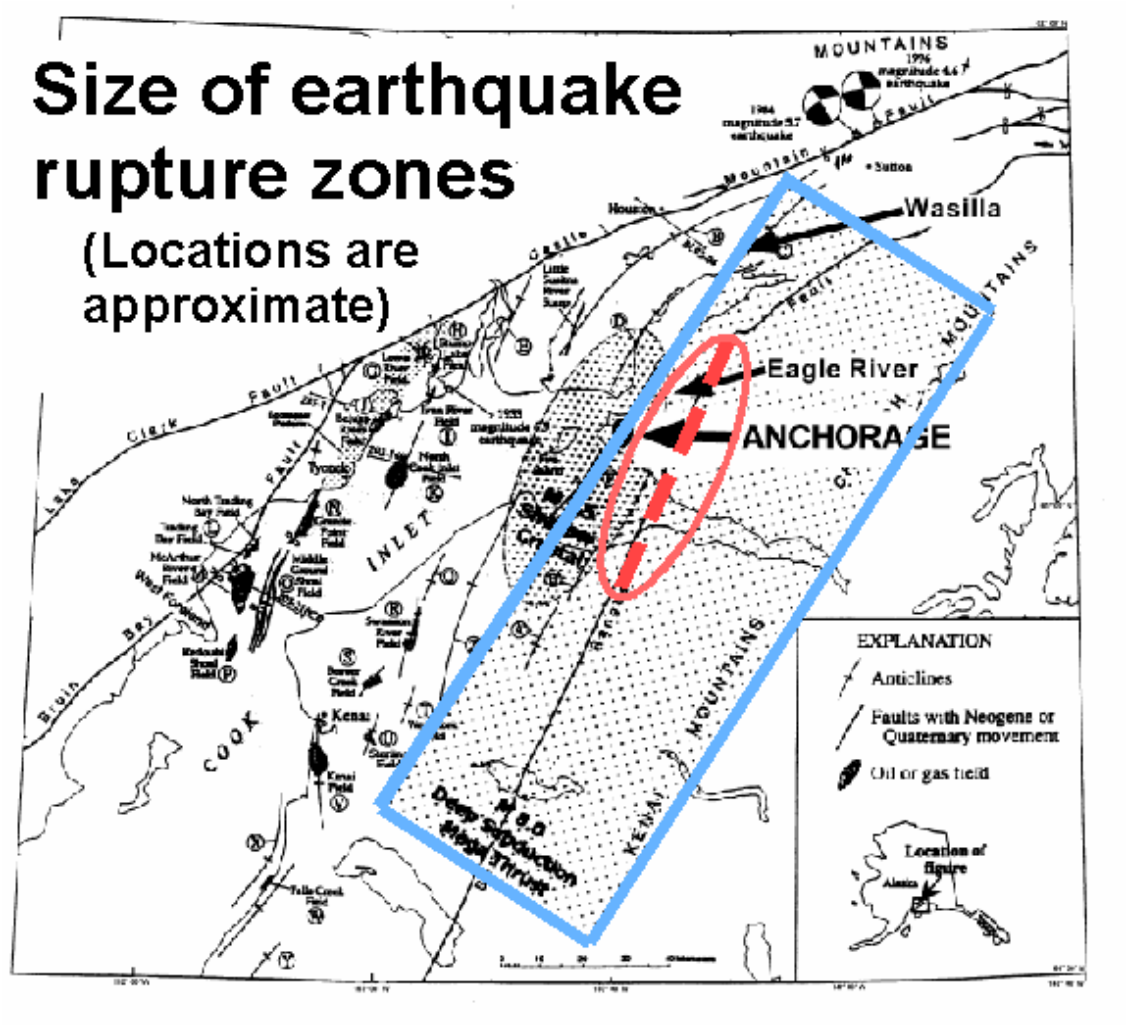


General Areas of Planning Earthquakes

Historical Earthquakes in Southcentral Alaska



SOUTHERN ALASKA.
2001 03 08 09:27:07.3& 61.542N 151.641W Depth: 85 km 2.4mb
Seismicity 1977 - 1997, Plate Boundaries in Yellow
USGS National Earthquake Information Center

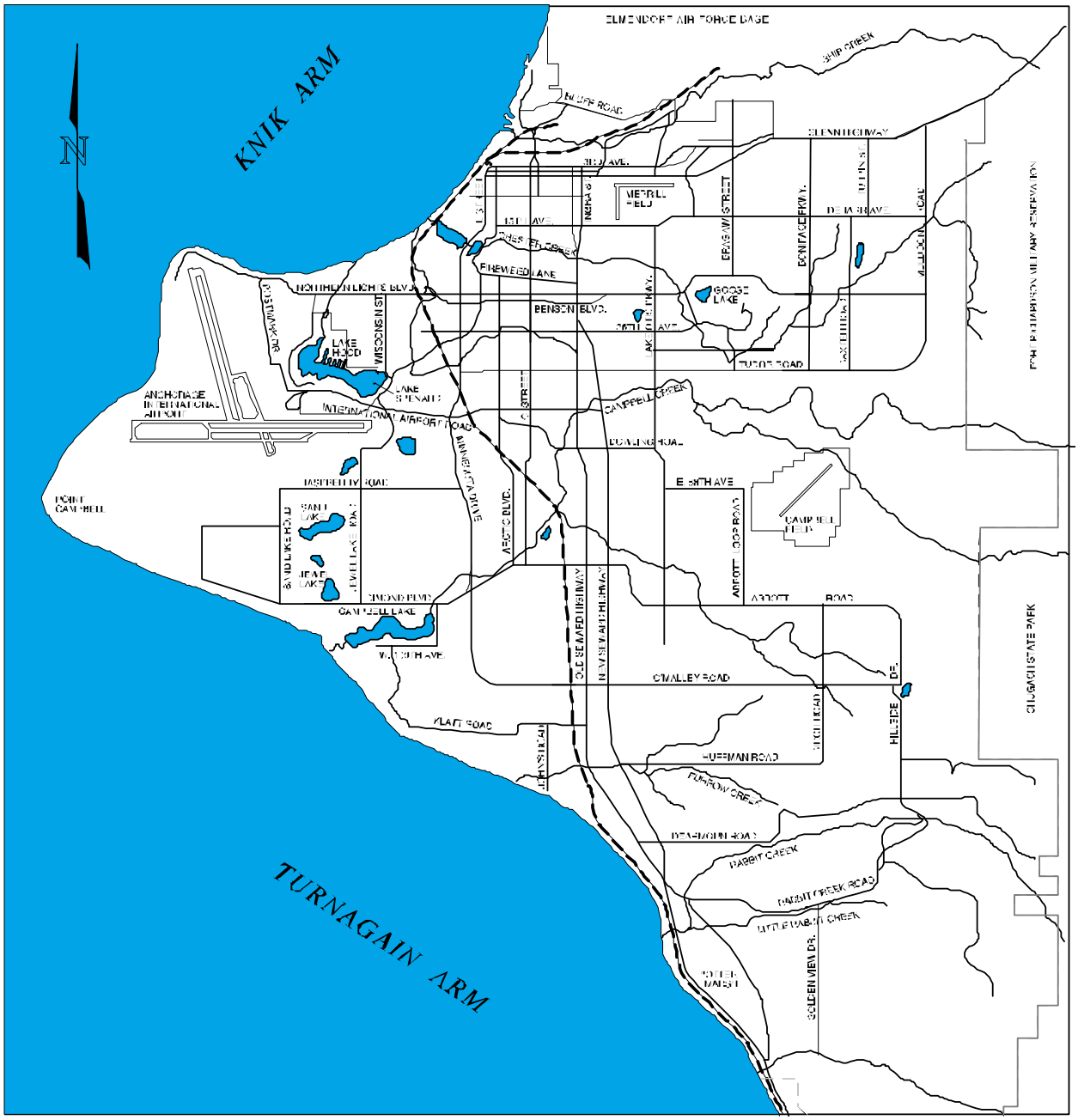


Blue = a potential rupture zone for the 8.0 deep subduction earthquake

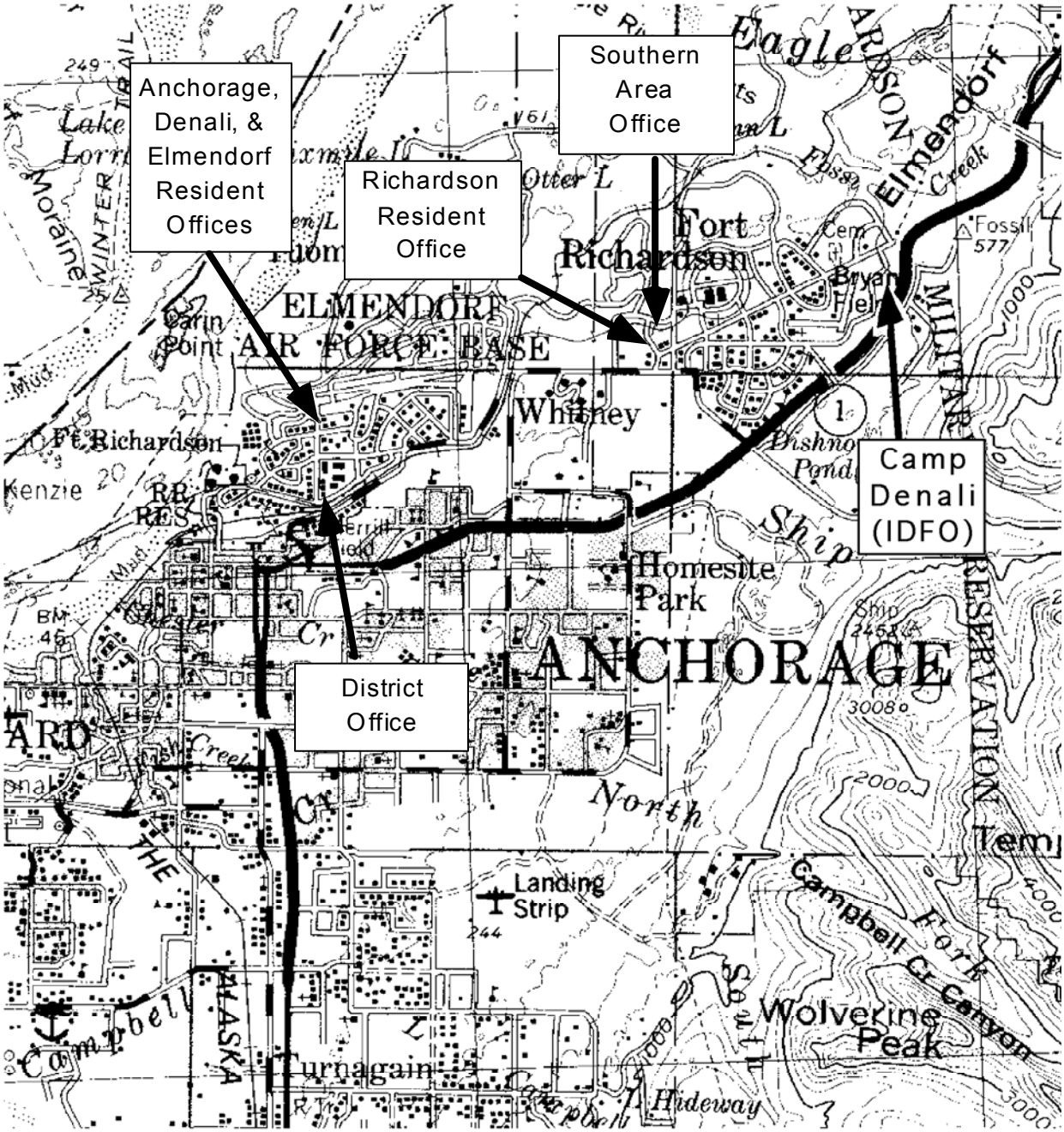
Red = a potential rupture zone for a magnitude 7.5 earthquake on the Border Ranges Fault.

Black = a potential rupture zone for a magnitude 7.5 earthquake in the Cook Inlet fold belt.

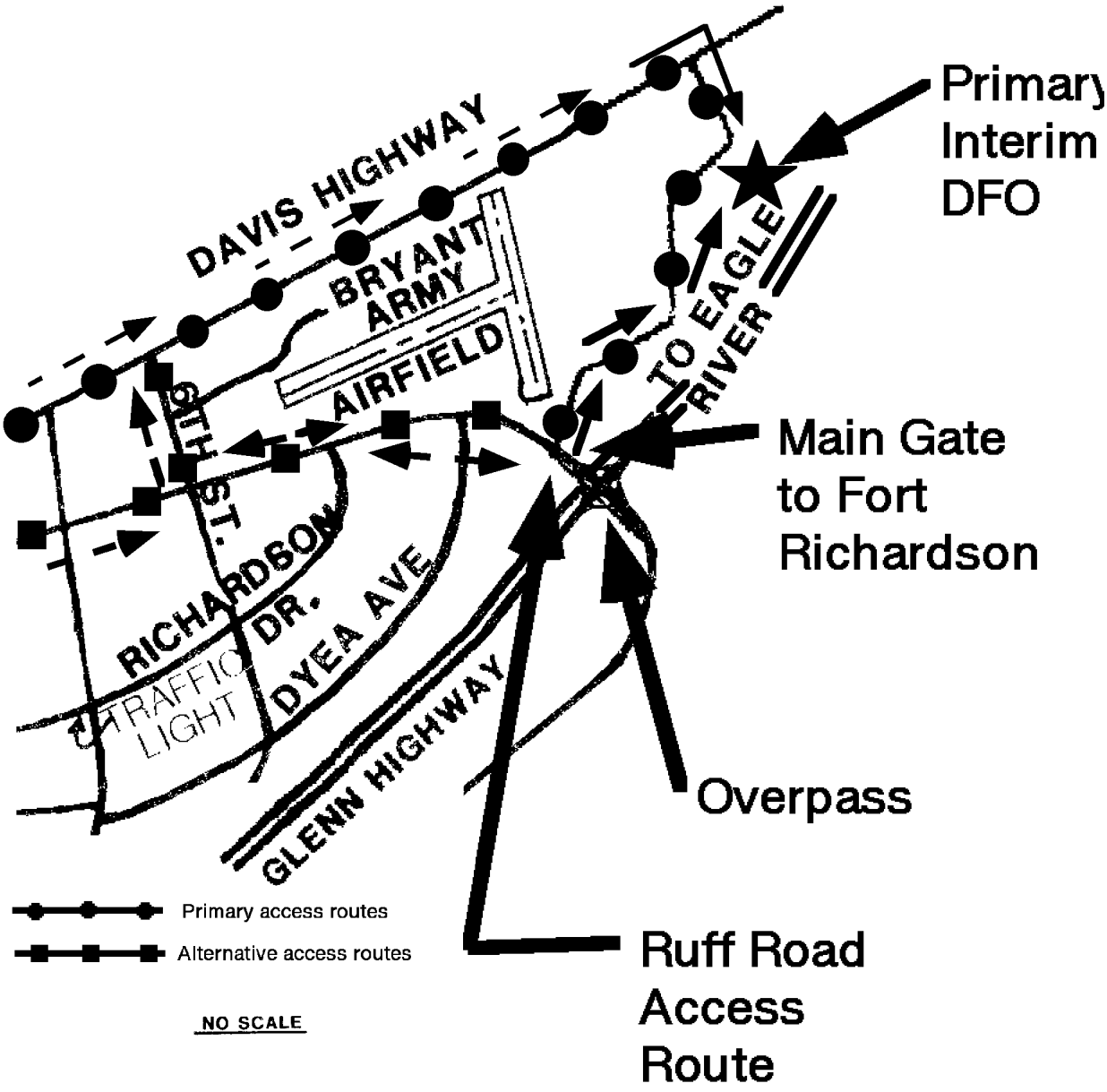
Anchorage Bowl Map



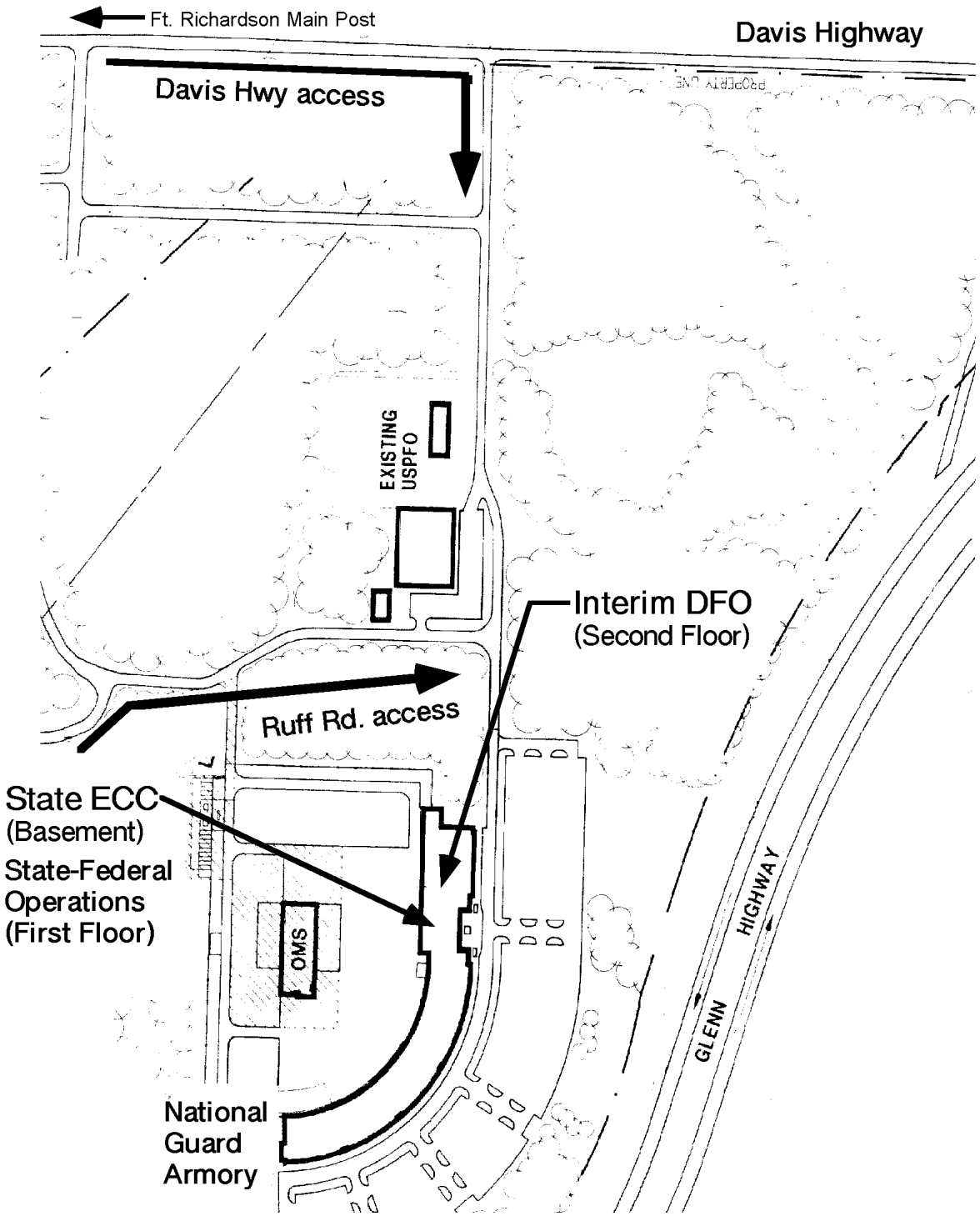
POA Facilities in Anchorage Area



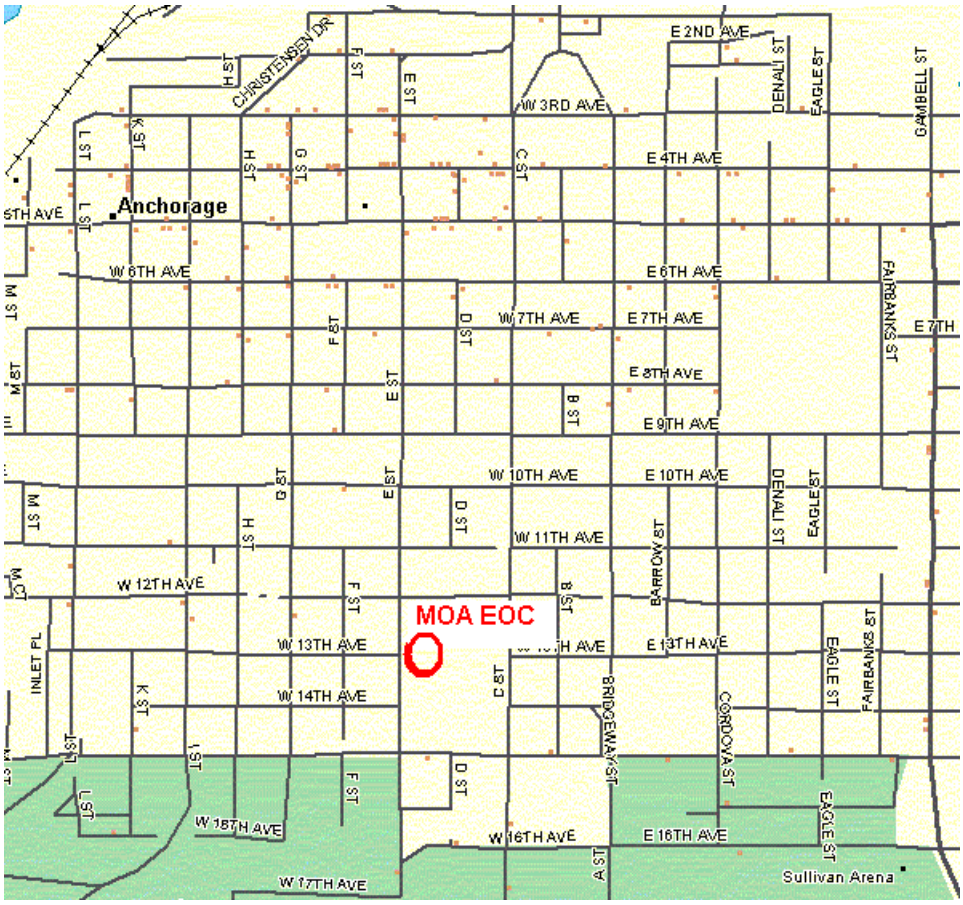
Location of IDFO & SCC



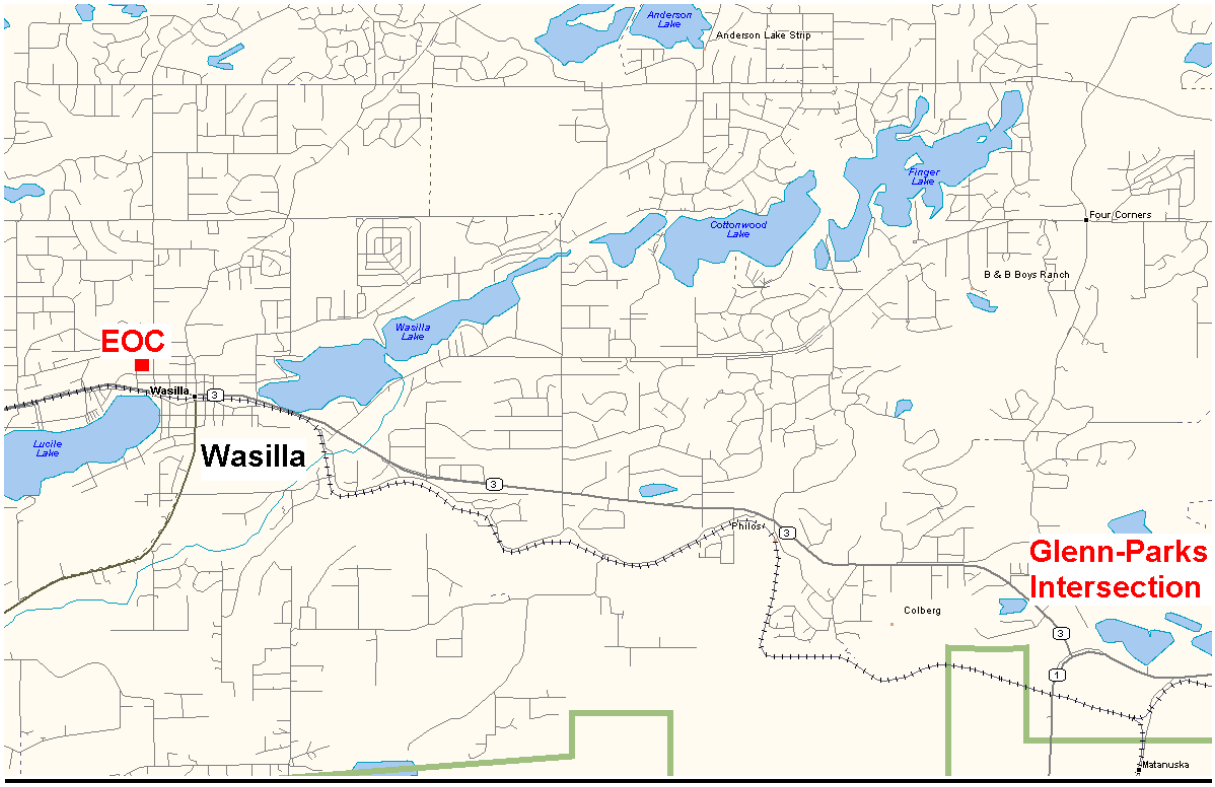
IDFO and SCC

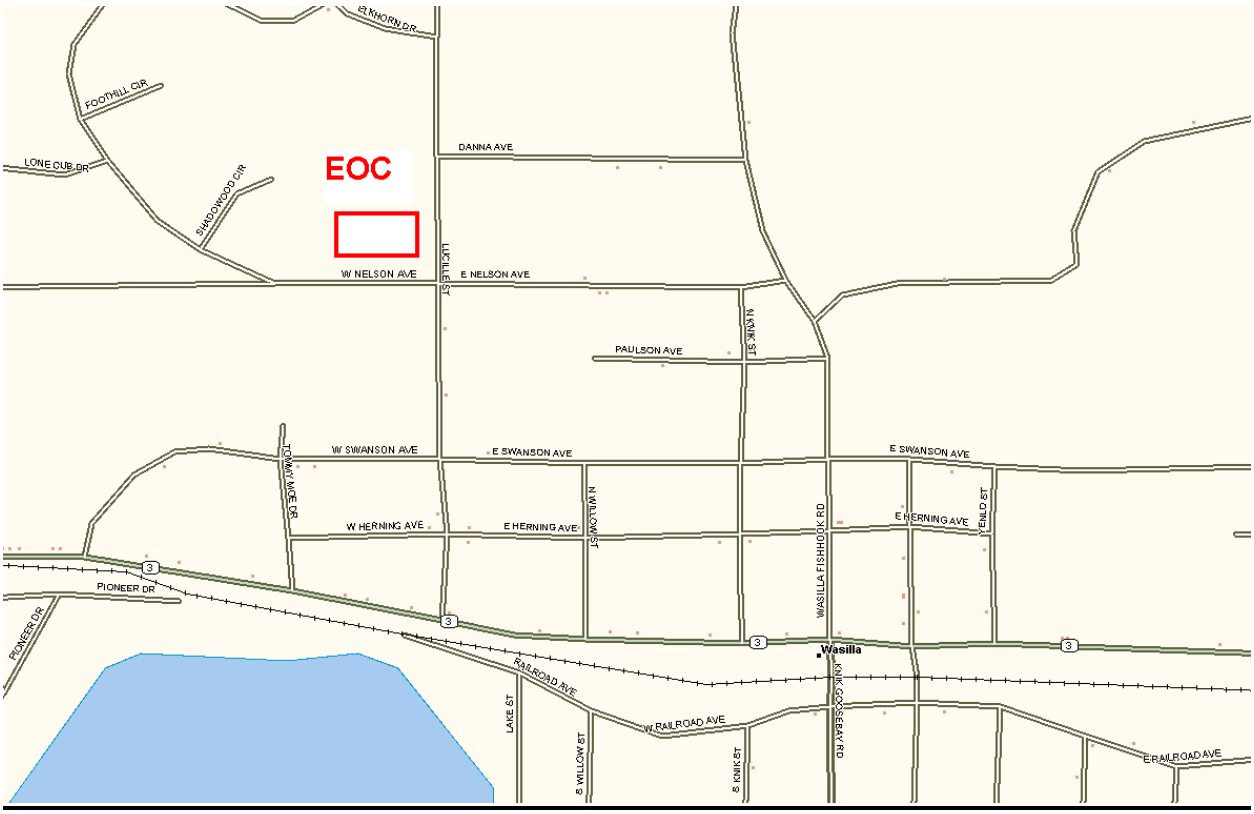

Ft. Richardson Main Post
Davis Highway
Davis Hwy access
EXISTING USPFO
Interim DFO
(Second Floor)
Ruff Rd. access
State ECC
(Basement)
State-Federal
Operations
(First Floor)
OMS
National
Guard
Armory
GLENN
HIGHWAY

Location of Municipality of Anchorage EOC

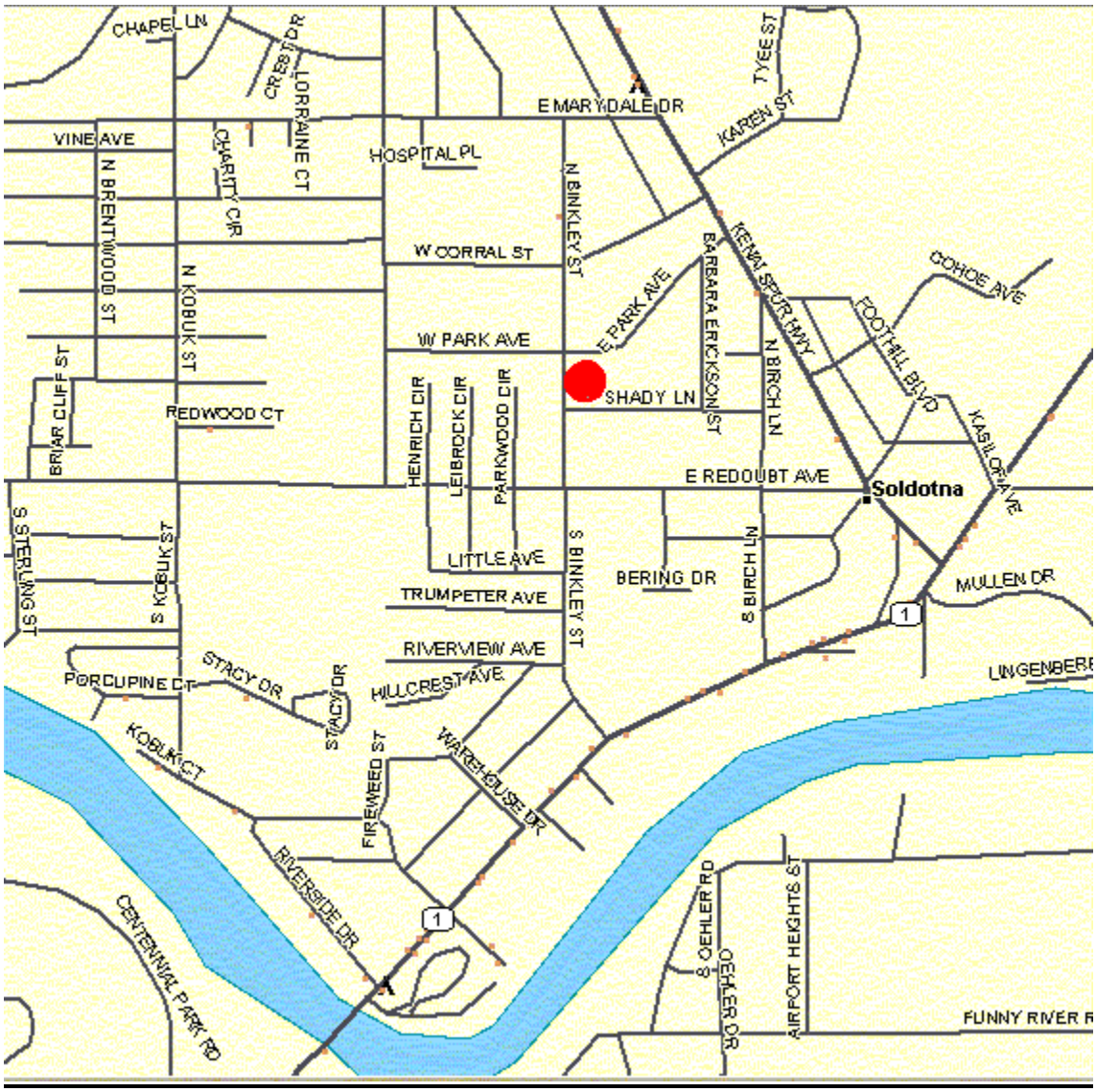


Location of Matanuska-Susitna Borough EOC





Location of Kenai Peninsula Borough EOC



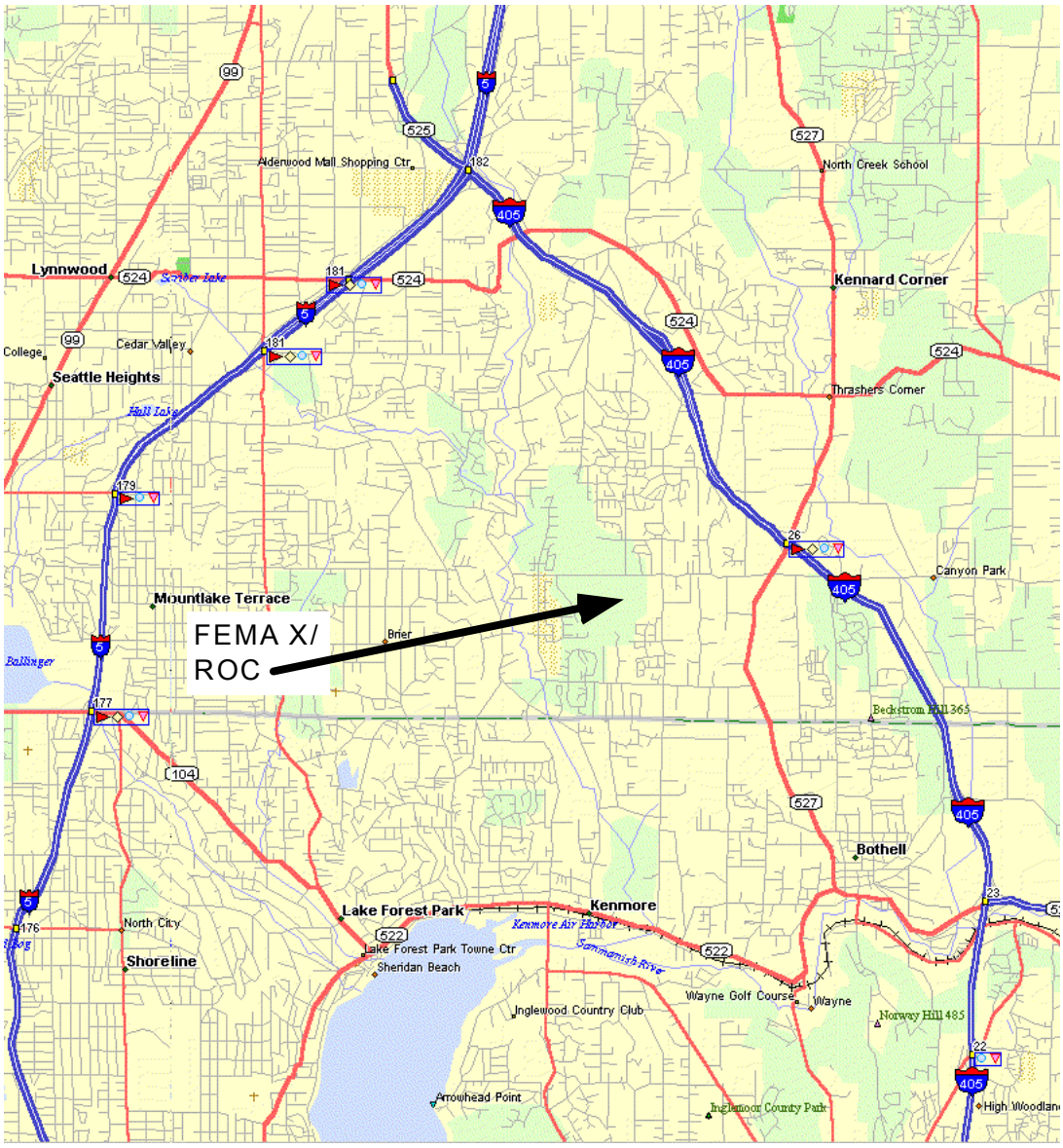
Regional Operations Center (ROC)

General Location

(see next page for close-up of ROC location)

Regional Operations Center (ROC)

General Location



(see next page for close-up of ROC location)

Regional Operations Center (ROC)

Location

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APPENDIX 2 TO ANNEX B TO ANCHORAGE EARTHQUAKE CDRP
ASSESSMENT OF POST-EARTHQUAKE SITUATION

Separate assessments were created, using HAZUS, for the 7.5 shallow crustal earthquake and the 8.0 subduction earthquake. These are presented in Tabs a and b, respectively.

While HAZUS provides a usable approximation of the effects that will occur, the predictions are limited by the accuracy of the default data used by HAZUS. Some of the more significant problems:

a. Shelter requirements for a catastrophic winter earthquake in Anchorage are expected to be far greater than predicted by HAZUS, since few residents will be camping in the yard. (At other times of the year, particularly with the large number of motor homes in the area, the shelter requirements are more realistic.)

b. Hospital damage appears to be overstated, as two of the four local hospitals have been replaced in the last 10 years.

c. Dollar value estimates were not available for damages to utilities, since the data base did not include any information on current value of assets.

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TAB A TO APPENDIX 2 TO ANNEX B TO ANCHORAGE EARTHQUAKE CDRP
HAZUS PREDICTIONS, 7.5 SHALLOW CRUSTAL EVENT

HAZUS uses the following set of information to define the earthquake parameters used for the earthquake loss estimate provided in this report.

Scenario Name	Anchorage 7.5
Type of Earthquake	Arbitrary event
Fault Name	Border Ranges
Historical Epicenter ID #	NA
Probabilistic Return Period	NA
Longitude of Epicenter	149.8 W
Latitude of Epicenter	61.16 N
Earthquake Magnitude	7.5
Depth (Km)	0
Rupture Length (Km)	85.1138
Rupture Orientation (degrees)	30
Attenuation Function	Boor, Joyner & Fumal (1994)

Building Damage

HAZUS estimates that about 40,000 buildings will be at least moderately damaged. This is over 67% of the total number of buildings in the region. There are an estimated 9,612 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the HAZUS technical manual. Table 1 below summaries the expected damage by general occupancy for the buildings in the region. Table 2 summaries the expected damage by general building type.

Table 1: Expected Building Damage by Occupancy

	None	Slight	Moderate	Extensive	Complete
Residential	6,809	13,113	20,943	8,630	8,750
Commercial	85	94	341	387	643
Industrial	11	8	56	72	128
Agriculture	0	1	3	3	9
Religion	8	11	26	23	53
Government	0	0	0	0	3
Education	5	0	5	5	26
Total	6,918	13,227	21,374	9,120	9,612

Table 2: Expected Building Damage by Building Type (All Design Levels)

	None	Slight	Moderate	Extensive	Complete
Concrete	47	69	197	244	499
Mobile Homes	58	115	488	1,144	4,774
Precast Concrete	26	13	69	104	204
RM*	43	36	133	171	254
Steel	48	12	93	131	247
URM*	1	0	6	20	149
Wood	6,695	12,982	20,338	7,306	3,485
Total (60,251)	6,918	13,227	21,374	9,120	9,612

*Note: RM Reinforced Masonry; URM Unreinforced Masonry

Essential Facility Damage

Before the earthquake, the region had 808 hospital beds available for use. On the day of the earthquake, the model estimates that only 2 hospital beds (60%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, 1% of the beds will be back in service. By 30 days, 8% will be operational.

NOTE: This figure will need to be re-evaluated. It appears the regional data supplied with the model included two hospital buildings that have been replaced within the last 5 years.

Table 3: Expected Damage to Essential Facilities

Classification	Total	Moderate or Greater Damage (>50%)	Complete Damage	>50% Functionality at day 1
Hospitals	7	7	6	0
Schools	168	168	122	0
EOCs	1	1	0	0
Police Stations	5	5	1	0
Fire Stations	7	7	5	0

Transportation and Utility Lifeline Damage

Table 4: Expected Damage to the Transportation Systems

			At least		Functionality >50% After	
System	Component	Locations/ Segments	Moderate Damage	Complete Damage	Day 1	Day 7
Highway	Roads	12	0	0	12	12
	Bridges	143	91	58	46	52
	Tunnels	0	0	0	0	0
Railways	Tracks	53	0	0	53	53
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	1	0	0	1	1
Bus	Facilities	0	0	0	0	0
Port	Facilities	2	0	0	2	2
Airport	Facilities	22	14	2	12	22
	Runways	27	0	0	27	27

Note: Roadway segments, railroad tracks and light rail tracks are assumed to be damaged by ground failure only. If ground failure maps are not provided, damage estimates to these components will not be computed.

Tables 5-7 provide information on the damage to the utility lifeline systems. Table 5 provides damage to the utility system facilities. Table 6 provides estimates on the number of leaks and breaks by the pipelines of the utility systems. For electric power and potable water, HAZUS performs a simplified system performance analysis. Table 7 provides a summary of the system performance information.

Table 5 : Expected Utility System Facility Damage

System	Total #	W/at Least Moderate Damage	With Complete Damage	With Functionality > 50 After: Day 1	Day 7
Potable Water	0	0	0	0	0
Waste Water	1	1	0	0	0
Natural Gas	2	1	0	0	2
Oil Systems	6	3	0	3	5
Electrical Power	12	10	1	0	10
Communication	53	39	4	33	53
Total	78	54	7	36	70

Table 6 : Expected Utility System Pipeline Damage

System	Total Pipelines Length (kms)	Number of Leaks	Number of Breaks
Potable Water	0	0	0
Waste Water	0	0	0
Natural Gas	0	0	0
Oil	0	0	0
Total	0	0	0

Table 7: Expected Potable Water and Electric Power System Performance

	Total # of Households	Number of Households without service at: Day 1	Day 3	Day 7	Day 30	Day 90
Potable Water	83,043	81,519	81,482	81,406	80,864	78,010
Electric Power	83,043	73,542	62,951	41,653	10,603	169

Table 8: Expected Communication Facility Functionality

	Total # of Facilities	Number of Households with service at: Day 0	Day 1	Day 3	Day 7	Day 30	Day 90
Anchorage, AK	53	17.17%	52.88%	74.15%	80.90%	95.46%	99.13%

Induced Earthquake Damage

Fire Following Earthquake

Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. HAZUS uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 19 ignitions that will burn about 30 sq. mi (0.1% of the region's total area.) The model also estimates that the fires will displace about 600 people and burn about 30 million dollars of building value.

Debris Generation

HAZUS estimates the amount of debris that will be generated by the earthquake. The model breaks the debris into two general categories: a) Brick/Wood and b) Reinforced Concrete/Steel. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 3.63 million tons of debris will be generated. Of the total amount, Brick/Wood comprises 30% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 145,000 truckloads (@25 tons/truck) to remove the debris generated by the earthquake.

Social Impact

Shelter Requirement

HAZUS estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 15,173 households to be displaced due to the earthquake. Of these, 9,718 people (out of a total population of 226,300) will seek temporary shelter in public shelters.

Casualties

HAZUS estimates the number of people that will be injured and killed by the earthquake. The casualties are broken down into four (4) severity levels that describe the extent of the injuries. The levels are described as follows;

· Severity Level 1: Injuries will require medical attention but hospitalization is not needed.
· Severity Level 2: Injuries will require hospitalization but are not considered life-threatening
· Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.
· Severity Level 4: Victims are killed by the earthquake.

The casualty estimates are provided for three (3) times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is maximum, the 2:00 PM estimate considers that the educational, commercial and industrial sector loads are maximum and 5:00 PM represents peak commute time.

Table 9: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Residential	3,578	665	55	55
	Non-Residential	177	34	5	5
	Commute	5	6	11	2
	Total	3,760	706	70	61
2 PM	Residential	815	152	12	12
	Non-Residential	9,407	1,834	249	249
	Commute	24	31	53	10
	Total	10,246	2,017	315	272
5 PM	Residential	968	180	15	15
	Non-Residential	2,835	550	74	74
	Commute	65	85	146	28
	Total	3,868	815	235	117

Economic Loss

The total economic loss estimated for the earthquake is 5.903 billion dollars, which represents 33% of the total replacement value of the region's buildings. The following three sections provide more detailed information about these losses.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

The total building-related losses were 5.903 billion dollars. 22% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 63% of the total loss. Table 10 below provides a summary of the losses associated with the building damage.

Table 10: Building-Related Economic Loss Estimates

(Millions of dollars)

Area	Residential	Commercial	Industrial	Others	Total
Building Loss					
Structural	540.6	306.1	38.6	45.4	930.6
Non-Structural	2,158.9	634.1	62.8	119.7	2,975.5
Content	428.9	173.9	30.4	30.4	663.6
Inventory	N/A	3.4	3.6	0.2	7.2
Subtotal	3,128.4	1,117.6	135.4	195.6	4,577.0
Business Interruption Loss					
Wage	31.1	225.4	5.7	8.6	270.8
Income	13.2	205.0	4.1	2.8	225.1
Rental	229.6	96.2	2.0	5.6	333.5
Relocation	303.3	135.5	8.3	49.3	496.5
Subtotal	577.2	662.2	20.2	66.3	1,325.9
Total	3,705.6	1,779.7	155.6	262.0	5,902.9

Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, HAZUS computes the direct repair cost for each component only. There are no losses computed by HAZUS for business interruption due to lifeline outages. Tables 11 & 12 provide a detailed breakdown in the expected lifeline losses.

HAZUS estimates the long-term economic impacts to the region for 15 years after the earthquake. The model quantifies this information in terms of income and employment changes within the region. Table 15 presents the results of the region for the given earthquake.

Table 11: Transportation System Economic Losses

(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Roads	1,334.0	0.0	0.0
	Bridges	179.0	67.5	37.7%
	Tunnels	0.0	0.0	0.0
	Subtotal	1,513.4	67.5	4.5
Railways	Tracks	292.4	0.0	0.3
	Bridges	0.0	0.0	0.0
	Tunnels	0.0	0.0	0.0
	Facilities	3.0	1.0	0.0
	Subtotal	295.1	1.0	0.3
Bus	Facilities	0.0	0.0	0.0
Port	Facilities	3.0	0.0	0.0
Airport	Facilities	125.0	50.4	40.3
	Runways	756.0	0.0	0.0
	Subtotal	881.0	50.4	5.7
TOTAL		2,692.8	118.8	4.4

Table 12: Utility System Economic Losses
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.0	0.0	0.0
	Facilities	0.0	0.0	0.0
	Distribution Lines	0.0	N/A	N/A
	Subtotal	0.0	0.0	0.0
Waste Water	Pipelines	0.0	0.0	0.0
	Facilities	0.0	40.5	0.0
	Distribution Lines	0.0	N/A	N/A
	Subtotal	0.0	40.5	0.0
Natural Gas	Pipelines	0.0	0.0	0.0
	Facilities	0.0	0.8	0.0
	Distribution Lines	0.0	N/A	N/A
	Subtotal	0.0	0.8	0.0
Oil Systems	Pipelines	0.0	0.0	0.0
	Facilities	0.0	161.0	0.0
	Subtotal	0.0	161.0	0.0
Electrical Power	Facilities	0.0	350.7	0.0
	Distribution Lines	0.0	N/A	N/A
	Subtotal	0.0	350.7	0.0
Communication	Facilities	0.0	45.0	0.0
	Distribution Lines	0.0	N/A	N/A
	Subtotal	0.0	45.0	0.0
Total		0.0	598.0	0.0

Table 13. Indirect Economic Impact
(with outside aid)

Year(s)	1	2	3	4	5	6-15	Units
Income Impact	-40	-138	-184	-184	-184	-184	million$
% Income Impact	-0.85	-2.90	-3.85	-3.85	-3.85	-3.85	percent
Employment Impact #persons	67	49	0	00	0	00	
Employment Impact	0.06	0.05	0.00	0.00	0.00	0.00	percent

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TAB B TO APPENDIX 2 TO ANNEX B TO ANCHORAGE EARTHQUAKE CDRP
HAZUS PREDICTIONS, 8.0 SUBDUCTION EVENT

HAZUS uses the following set of information to define the earthquake parameters used for the earthquake loss estimate provided in this report.

Scenario Name	Anchorage Matanuska Kenai 8.0 Subduction
Type of Earthquake	Subduction zone
Fault Name	Alaska-Aleutian Megathrust
Historical Epicenter ID #	NA
Probabilistic Return Period	NA
Longitude of Epicenter	150 W
Latitude of Epicenter	61 N
Earthquake Magnitude	8.0
Depth (Km)	20
Rupture Length (Km)	23
Rupture Orientation (degrees)	30
Attenuation Function	Youngs et. al. (1995)

Building Damage

HAZUS estimates that about 18,000 buildings will be at least moderately damaged. This is over 19% of the total number of buildings in the region. There are an estimated 1,374 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the HAZUS technical manual. Table 1 below summaries the expected damage by general occupancy for the buildings in the region. Table 2 summaries the expected damage by general building type.

Table 1: Expected Building Damage by Occupancy

	None	Slight	Moderate	Extensive	Complete
Residential	51,217	24,702	12,412	3,556	1,213
Commercial	656	288	510	262	128
Industrial	105	39	88	44	25
Agriculture	16	4	4	0	0
Religion	86	26	35	17	7
Government	4	0	0	0	0
Education	52	5	11	3	1
Total	52,136	25,064	13,060	3,882	1,374

Table 2: Expected Building Damage by Building Type (All Design Levels)

	None	Slight	Moderate	Extensive	Complete
Concrete	482	264	402	231	91
Mobile Homes	2,247	1,676	3,249	2,665	1,073
Precast Concrete	176	52	140	78	43
RM*	318	105	179	126	43
Steel	256	62	190	88	42
URM*	37	13	39	50	73
Wood	48,620	22,892	8,861	644	9
Total (95,515)	52,136	25,064	13,060	3,882	1,374

*Note: RM Reinforced Masonry; URM Unreinforced Masonry

Essential Facility Damage

Before the earthquake, the region had 983 hospital beds available for use. On the day of the earthquake, the model estimates that only 163 hospital beds (17%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, 26% of the beds will be back in service. By 30 days, 50% will be operational.

NOTE: This figure will need to be re-evaluated. It appears the regional data supplied with the model included two hospital buildings that have been replaced within the last 5 years.

Table 3: Expected Damage to Essential Facilities

Classification	Total	Moderate or Greater Damage (>50%)	Complete Damage	>50% Functionality at day 1
Hospitals	13	7	0	4
Schools	264	193	0	65
EOCs	3	1	0	1
Police Stations	10	3	0	4
Fire Stations	17	17	0	8

Transportation and Utility Lifeline Damage

Table 4: Expected Damage to the Transportation Systems

			At least		Functionality >50% After	
System	Component	Locations/ Segments	Moderate Damage	Complete Damage	Day 1	Day 7
Highway	Roads	32	0	0	32	32
	Bridges	291	44	8	275	291
	Tunnels	0	0	0	0	0
Railways	Tracks	64	0	0	64	64
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	4	0	0	4	4
Bus	Facilities	0	0	0	0	0
Ferry	Facilities	0	0	0	0	0
Port	Facilities	9	0	0	9	9
Airport	Facilities	120	16	1	120	120
	Runways	134	0	0	134	134

Note: Roadway segments, railroad tracks and light rail tracks are assumed to be damaged by ground failure only. If ground failure maps are not provided, damage estimates to these components will not be computed.

Tables 5-7 provide information on the damage to the utility lifeline systems. Table 5 provides damage to the utility system facilities. Table 6 provides estimates on the number of leaks and breaks by the pipelines of the utility systems. For electric power and potable water, HAZUS performs a simplified system performance analysis. Table 7 provides a summary of the system performance information.

Table 5 : Expected Utility System Facility Damage

System	Total #	W/at Least Moderate Damage	With Complete Damage	With Functionality > 50 After: Day 1	Day 7
Potable Water	0	0	0	0	0
Waste Water	0	0	0	0	0
Natural Gas	1	0	0	1	1
Oil Systems	12	3	0	7	12
Electrical Power	5	3	0	1	5
Communication	118	32	1	118	118
Total	137	39	7	127	136

Table 6 : Expected Utility System Pipeline Damage

System	Total Pipelines Length (kms)	Number of Leaks	Number of Breaks
Potable Water	0	0	0
Waste Water	0	0	0
Natural Gas	0	0	0
Oil	238	1	1
Total	238	1	1

Table 7: Expected Potable Water and Electric Power System Performance

	Total # of Households	Number of Households without service at: Day 1	Day 3	Day 7	Day 30	Day 90
Potable Water	107,867	17,106	12,926	5,643	0	00
Electric Power	107,867	64,315	37,387	14,437	768	111

Induced Earthquake Damage

Fire Following Earthquake

Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. HAZUS uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 4 ignitions that will burn about 10 sq. mi (0.0% of the region's total area.) The model also estimates that the fires will displace about 0 people and burn about 0 million dollars of building value.

Debris Generation

HAZUS estimates the amount of debris that will be generated by the earthquake. The model breaks the debris into two general categories: a) Brick/Wood and b) Reinforced Concrete/Steel. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 1.38 million tons of debris will be generated. Of the total amount, Brick/Wood comprises 28% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 55,000 truckloads (@25 tons/truck) to remove the debris generated by the earthquake.

Social Impact

Shelter Requirement

HAZUS estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 4,059 households to be displaced due to the earthquake. Of these, 2,596 people (out of a total population of 306,800) will seek temporary shelter in public shelters.

Casualties

HAZUS estimates the number of people that will be injured and killed by the earthquake. The casualties are broken down into four (4) severity levels that describe the extent of the injuries. The levels are described as follows;

- Severity Level 1: Injuries will require medical attention but hospitalization is not needed.
- Severity Level 2: Injuries will require hospitalization but are not considered life-threatening
- Severity Level 3: Injuries will require hospitalization and can become life threatening is not promptly treated.
- Severity Level 4: Victims are killed by the earthquake.

The casualty estimates are provided for three (3) times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is maximum, the 2:00 PM estimate considers that the educational, commercial and industrial sector loads are maximum and 5:00 PM represents peak commute time.

Table 8: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Residential	804	136	12	12
	Non-Residential	63	12	1	1
	Commute	1	1	2	0
	Total	868	149	15	13
2 PM	Residential	201	34	3	3
	Non-Residential	2,928	540	70	70
	Commute	4	5	8	2
	Total	3,132	578	81	74
5 PM	Residential	239	40	4	4
	Non-Residential	988	183	24	24
	Commute	11	14	24	5
	Total	1,238	237	51	33

Economic Loss

The total economic loss estimated for the earthquake is 2.242 billion dollars, which represents 6% of the total replacement value of the region's buildings. The following three sections provide more detailed information about these losses.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

The total building-related losses were 2.2423 billion dollars. 25% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 53% of the total loss. Table 9 below provides a summary of the losses associated with the building damage.

Table 9: Building-Related Economic Loss Estimates
(Millions of dollars)

Area	Residential	Commercial	Industrial	Others	Total
Building Loss					
Structural	146.9	138.8	18.3	18.6	322.6
Non-Structural	679.8	289.5	31.7	45.8	1,046.8
Content	180.9	103.1	17.3	15.6	316.9
Inventory	N/A	2.1	2.1	0.1	4.2
Subtotal	1,007.6	533.5	69.4	80.1	1,690.6
Business Interruption Loss					
Wage	14.7	107.7	2.6	3.9	128.9
Income	6.2	99.2	1.9	1.2	108.6
Rental	76.1	50.4	1.2	2.4	130.1
Relocation	81.7	74.6	5.5	22.0	183.7
Subtotal	178.7	331.9	11.2	29.5	551.3
Total	1,186.3	865.3	80.6	109.6	2,241.8

Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, HAZUS computes the direct repair cost for each component only. There are no losses computed by HAZUS for business interruption due to lifeline outages. Tables 10 & 11 provide a detailed breakdown in the expected lifeline losses.

HAZUS estimates the long-term economic impacts to the region for 15 years after the earthquake. The model quantifies this information in terms of income and employment changes within the region. Table 12 presents the results of the region for the given earthquake.

Table 10: Transportation System Economic Losses
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Roads	10,181.3	0.0	0.0
	Bridges	403.0	14.5	3.6
	Tunnels	0.0	0.0	0.0
	Subtotal	10,584.3	14.5	0.1
Railways	Tracks	677.4	0.0	0.2
	Bridges	0.0	0.0	0.0
	Tunnels	0.0	0.0	0.0
	Facilities	12.0	1.1	9.3
	Subtotal	689.4	1.1	0.2
Bus	Facilities	0.0	0.0	0.0
Ferry	Facilities	0.0	0.0	0.0
Port	Facilities	13.5	0.0	0.0
Airport	Facilities	834.0	63.1	0.0
	Runways	3,752.0	0.0	0.0
	Subtotal	4,586.0	63.1	1.4
TOTAL		15,873.2	78.7	0.5

Table 11: Utility System Economic Losses
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.0	0.0	0.0
	Facilities	0.0	0.0	0.0
	Distribution Lines	0.0	N/A	N/A
	Subtotal	0.0	0.0	0.0
Waste Water	Pipelines	0.0	0.0	0.0
	Facilities	0.0	0.0	0.0
	Distribution Lines	0.0	N/A	N/A
	Subtotal	0.0	40.5	0.0
Natural Gas	Pipelines	0.0	0.0	0.0
	Facilities	0.0	0.1	0.0
	Distribution Lines	0.0	N/A	N/A
	Subtotal	0.0	0.8	0.0
Oil Systems	Pipelines	0.0	0.0	0.0
	Facilities	0.0	96.6	0.0
	Subtotal	0.0	96.6	0.0
Electrical Power	Facilities	0.0	66.8	0.0
	Distribution Lines	0.0	N/A	N/A
	Subtotal	0.0	66.8	0.0
Communication	Facilities	0.0	34.4	0.0
	Distribution Lines	0.0	N/A	N/A
	Subtotal	0.0	34.4	0.0
Total		0.0	197.9	0.0

Table 12. Indirect Economic Impact
(with outside aid)

Year(s)	1	2	3	4	5	6-15	Units
Income Impact	-13	-48	-64	-64	-64	-64	million$
% Income Impact	-0.23	-0.80	-1.08	-1.08	-1.08	-1.08	percent
Employment Impact	21	26	0	0	0	0	#persons
Employment Impact	0.02	0.02	0.00	0.00	0.00	0.00	percent

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APPENDIX 3 TO ANNEX B TO ANCHORAGE EARTHQUAKE CDRP
RESOURCES

1. **Contractors.** POA Contracting Division maintains a bidders list, which identifies those contractors who have expressed an interest in obtaining contracts from the Corps in Alaska. If POA-CT is not operational, the list may be accessed . . .

2. **Construction Materials.** While there are several major suppliers of construction supplies in Anchorage, they do not have the stocks needed to respond to a catastrophic earthquake. Stockage tends to be highest in the early summer, and lowest at the end of the calendar year (to minimize tax liability). Based on the EXXON VALDEZ experience, local individuals and businesses will quickly buy up the available supplies. Most construction materials will need to be obtained from stocks in the Puget Sound area, or elsewhere in CONUS. For the response period, transportation will need to be coordinated through the ROC/DFO, due to the many urgent requirements for limited air and sea transportation. The NARC will assist in purchasing and shipping materials and equipment.

3. **Construction Equipment.** Alaska has a very active construction industry, and many contractors have equipment yards within Anchorage. However, much of the equipment is inactive during the winter, and will not be immediately available. (Front end loaders and dump trucks are notable exceptions, as they are used for snow removal).

4. **Construction Personnel.** Due to the seasonal slowdown, some construction workers spend at least part of the winter outside of Alaska. In addition, workers residing in the impacted area will need to handle personal impacts. Contractors will need to bring in workmen during the initial stages of the response.

5. Workforce accommodations. Many of the construction personnel working in the Anchorage area use their normal residences; others normally rely on commercial facilities rather than construction camps. Due to the extensive housing damage, housing for workforce will be a major concern for response contractors.

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APPENDIX 4 TO ANNEX B TO ANCHORAGE EARTHQUAKE CDRP
RESIDUAL CEPOA CAPABILITIES

1. The Alaska District currently has approximately 575 employees, with approximately 75 employees living in Fairbanks/North Pole and Juneau. Based on normal Anchorage-area workforce statistics, about 30 employees would be expected to commute from the Matanuska-Susitna Borough.

2. 7.5 shallow crustal: Based on general population figures, approximately 140 employees would have extensive or complete damage to their homes; an additional 170 would be dealing with moderate damage. Of the remaining 190 employees with slight or no damage to their homes, 30 would be from the Matanuska-Susitna Borough and would initially encounter access problems. In cold weather, even those with no home damage might still need to take emergency steps to drain pipes to prevent extensive plumbing damage in the event of a power outage. Based on HAZUS projections, during the work day there would be 5 persons killed or hospitalized and another 18 requiring medical attention but not hospitalization. Outside the work day, this would drop to 1 or 2 killed or hospitalized and 7 requiring medical attention but not hospitalization. Additional employees would be unavailable because of similar injuries to family members; however, this is approximately balanced by the employees who would be counted twice above (unavailable due to both injuries and residence damage). Based on these figures, the Alaska District would be a "victim district" with approximately one-third effective strength available during the initial disaster period.

3. 8.0 subduction: Based on general population figures, approximately 20 employees would have complete or severe damage to their homes; 70 would have moderate damage, while 410 would have slight or no damage. Counting all levels of medical treatment, and both employees and their family members, the loss would be under 10 persons during non-duty events and under 20 for duty events. In this circumstance, Alaska District would be capable of conducting its regular missions but would require some TDY support to replace personnel unavailable due to injuries/residence damage, to replace employees who are diverted to Federal Response Plan missions, and to handle disaster-related workload from existing customers. Alaska District would not be capable of organizing an ERRO.

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APPENDIX 4 TO ANNEX B TO ANCHORAGE EARTHQUAKE CDRP
RESIDUAL CEPOA CAPABILITIES

1. The Alaska District currently has approximately 575 employees, with approximately 75 employees living in Fairbanks/North Pole and Juneau. Based on normal Anchorage-area workforce statistics, about 30 employees would be expected to commute from the Matanuska-Susitna Borough.

2. 7.5 shallow crustal: Based on general population figures, approximately 140 employees would have extensive or complete damage to their homes; an additional 170 would be dealing with moderate damage. Of the remaining 190 employees with slight or no damage to their homes, 30 would be from the Matanuska-Susitna Borough and would initially encounter access problems. In cold weather, even those with no home damage might still need to take emergency steps to drain pipes to prevent extensive plumbing damage in the event of a power outage. Based on HAZUS projections, during the work day there would be 5 persons killed or hospitalized and another 18 requiring medical attention but not hospitalization. Outside the work day, this would drop to 1 or 2 killed or hospitalized and 7 requiring medical attention but not hospitalization. Additional employees would be unavailable because of similar injuries to family members; however, this is approximately balanced by the employees who would be counted twice above (unavailable due to both injuries and residence damage). Based on these figures, the Alaska District would be a "victim district" with approximately one-third effective strength available during the initial disaster period.

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