

United States Fire Administration

Urban Search and Rescue in the Santa Cruz Area Following the Loma Prieta Earthquake



Federal Emergency Management Agency
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Office of Firefighter Health and Safety

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Urban Search and Rescue Program

As a result of a number of major emergencies including structural collapse both here and abroad over the last decade, the concept of urban search and rescue (USAR) has become increasingly recognized as an important element in integrated emergency response. These incidents include catastrophic earthquakes in California, the Philippines, and Soviet Armenia and structural collapses in Brownsville, Texas, and New York City. Following Hurricane Hugo and the California Earthquake in 1989, both of which served to draw attention to the need for improved urban search and rescue capabilities and resources, the Federal Emergency Management Agency (FEMA) undertook a major initiative to establish a National Urban Search and Rescue System.

The initial goal of the FEMA program has been to establish 25 qualified USAR task forces placed strategically throughout the nation. These task forces provide the ability to respond to major incidents within a few hours of activation and offer a full range of capabilities in incident management; search; rescue; specialty medical care for entrapped patients; and technical disciplines including structural engineering, heavy equipment operation, hazardous materials and communications.

In addition, an Advisory Committee on the National USAR System has been formed consisting of federal government experts, state and local officials, and the private sector to guide further development of the System and to serve as a forum for discussing issues and exchanging information related to urban search and rescue.

To complement the efforts of the Federal Emergency Management Agency in Urban search and Rescue, the United States Fire Administration (USFA) has also initiated research and development and information dissemination efforts on USAR. Study reports are being produced for USFA under its "Investigation of Urban search and Rescue Incidents" program that will broaden the base of information available about USAR tactics, management and technology, and contribute to reducing the number and severity of casualties by highlighting the lessons learned, both the successes and the failures, from such operations in the past. The investigation reports, such as this one, provide detailed information about the magnitude and the incidents themselves; how the response to the incidents was carried out and managed; and the impact of these incidents on emergency responders and the emergency response systems in the community. The United States Fire Administration greatly appreciates the cooperation and information it is receiving from the fire service, county and state officials, and other emergency responders as this research progresses.

Additional copies of this report can be ordered from the Federal Emergency Management Agency/United States Fire Administration. For more information about USFA's program, write United States Fire Administration, 16825 South Seton Avenue, Emmitsburg, Maryland 21727.

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**Urban Search and Rescue in
the Santa Cruz Area
Following the Loma Prieta Earthquake
October 17, 1989**

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INTRODUCTION

This document was prepared to examine the lessons learned by three communities in the Santa Clara and Santa Cruz Counties area during the Loma Prieta Earthquake. To examine the earthquake and the responses to it requires the introduction of background information which goes beyond these three geographic areas. This report begins with an overview of the earthquake and its consequences, and a brief description of the regional and state organization and plans for responding to major emergencies. The individual communities and their responses to this emergency are then described along with the lessons learned.

OVERVIEW

At 5:04 p.m., Tuesday, October 17, 1989, the Loma Prieta Earthquake struck the Santa Cruz area with a force that measured 7.1 on the Richter Scale. The epicenter was reported to be near the Loma Prieta Mountain, 10 miles northeast of Santa Cruz and 60 miles southeast of San Francisco (see the Appendix for a map of the region). The earthquake caused 64 confirmed fatalities, more than 3,750 reported injuries, and property damage estimates in excess of \$7 billion. More than 23,500 buildings were destroyed. The building collapses, other structural collapses, and subsequent fires were primarily focused in the San Francisco/Monterey Bay area, including the upper deck of the two-tiered Interstate 880 which collapsed onto its lower deck for a distance of 1.5 miles. One hundred sixteen people were injured in this road collapse¹ and 42 were killed.²

Following the earthquake, considerable attention was given to the assessment of emergency response and management in the form of after-action reports and surveys by local, state, and federal agencies. Primarily, these reports focused on the events in San Francisco and Oakland. While these population and media centers were severely damaged and suffered dramatic losses, other areas experienced similar devastation and initially responded with far fewer resources at their disposal.

The purpose of this report is to highlight the lessons learned during the emergency responses in the smaller, but equally affected communities which had

¹ Federal Emergency Management Agency, United States Fire Administration, *The Loma Prieta Earthquake: Emergency Response and Stabilization Study*, Washington, DC, US. Government Printing Office, FA-103, September 1991, p. 27. (Hereinafter referred to as "The Stabilization Study.")

² Lieutenant Susan Tyler, "Computer Assistance for the California Earthquake Rescue Effort," *The Police Chief*, February 1990, pp. 42-43.

fewer immediate resources, available to them. In terms of size, organization, and resources, the communities of Santa Cruz, Los Gatos, and Watsonville are probably more typical of emergency services in the United States than are San Francisco and Oakland; and an examination of their lessons learned will be meaningful to a broad audience of emergency service personnel.

ACKNOWLEDGEMENTS

The Federal Emergency Management Agency, United States Fire Administration gratefully acknowledges the cooperation, assistance, and information provided for this report by fire service and other local officials in the Santa Cruz area, most particularly Chief Douglas Sporleder, Santa Clara County Fire Protection District, Los Gatos; Chief Gary Smith, Watsonville Fire Department; and Chief Ed Eakers, Santa Cruz Fire Department.

PRE-PLANNING FOR AN EARTHQUAKE³

Without exception, everyone interviewed during the preparation of this report said that had it not been for pre-planning, the results of the earthquake damage would have been far more disastrous. That each community planned for and participated in drill exercises to prepare for such an event was cited as the most important “lesson learned.” When asked to pass along one major piece of advice to colleagues throughout the country, each emergency service manager said, “Plan.” This cannot be emphasized enough.

Work on the Southern California Earthquake Response Plan (SCERP) began in the early 1980s and proceeded to a final draft by 1986. SCERP exercises were conducted in 1985, 1986, and 1987. SCERP application in northern

³ The Stabilization Study, p. 8-9.

California began in 1988, specifically to address an earthquake in the San Francisco Bay area. The plan was to describe the responsibilities, organizations, and concept of operations necessary for a massive emergency response effort by all levels of government on a scale never before undertaken. Described as a living document, the plan was expected to need periodic updating to reflect the lessons learned from exercises, improved response capabilities, and additional details developed through ongoing training.

The Plan for Federal Response for ‘a Catastrophic Earthquake’ was issued in 1987. The plan provides mechanisms for federal agencies to assist local and state government to respond rapidly to a major earthquake. Since 1987, state and federal agencies have worked together to develop supplements to the plan for northern and southern California.

The state and federal plans were first exercised in August 1989, less than three months before the Loma Prieta Earthquake. “Response 89” was a federally sponsored exercise to test the response plans and specifically addressed the possibility of an earthquake affecting the San Francisco area.

MUTUAL AID⁴

In addition to SCERP, the California Emergency Services Act revised disaster preparedness planning in the state and established the legal basis for the governor’s response to major emergency situations faced by the state. The Office of Emergency Services (OES) became the state agency to coordinate response to disasters. OES holds a large supply of fire and rescue equipment.

⁴ Ibid, 9-10.

The Firefighting Resources of California Organized for Potential Emergencies (FIRESCOPE) program developed the Incident Command System (ICS) which provides an organizational structure for emergency management involving response by diverse agencies. The ICS consists of procedures to control personnel, facilities, equipment, and communications.

Additionally, there is also a Master Mutual Aid Agreement (MMAA) which provides for the provision of mutual aid between communities. It includes every segment of the state, each of the 58 counties, and nearly all local governments. Local fire officials maintain active involvement in the day-to-day management of the system. Briefly, the MMAA provides for mobilization, organization, and operation of fire service resources; comprehensive and compatible plans for response on a local, regional, and statewide basis; guidelines for recruitment and training for auxiliary personnel; an updated annual inventory of all resources; a plan for and communication of fire related data and information; and coordination and implementation at the state level of government.

THE EARTHQUAKE

The epicenter of the earthquake was about 10 miles to the northeast of Santa Cruz, and was caused by the rupture of a 25 mile segment of the San Andreas fault at a depth of about 11 miles. There were no seismic indicators in the days before the incident to warn that an earthquake was imminent.⁵

For understanding, it is important to delineate for the reader the difference between the earthquake and the response to the earthquake. Although none of the published literature described it this way and no one interviewed explained it

⁵ Ibid, Executive Summary.

this way,' all alluded to or somehow established the fact that the earthquake was not an incident but an EVENT, and that EVENT caused numbers of incidents. In other words, the earthquake was not just a site specific "incident" but a regional disaster encompassing a large multijurisdictional region severely taxing all resources and agencies. The reason for making this distinction is that it simplifies the description of the Incident Command System (ICS) later in this document.

Throughout the area affected, the earthquake resulted in:

- Collapsed or damaged commercial buildings and homes
- Damaged government buildings which hampered response and recovery efforts
- Damaged roads and bridges, some collapsed
- Numerous deaths, injuries, and rescue situations
- Simultaneous fires
- Ruptured valves and water lines, and damaged storage tanks
- Loss of electrical power and natural gas supplies
- Disruption of telephone communications and fire detection/alarm systems
- Impaired automatic fire protection systems
- Landslides blocking transportation routes
- Hazardous materials spills
- Numerous displaced persons
- Anxiety over the often unknown safety or condition of family members⁶

As in any event of this magnitude, every emergency agency: police, fire, and EMS, is overwhelmed by the number of critical emergencies and calls for assistance. In reality, it is impossible to immediately assess the scope and

⁶ Ibid.

intensity of this type of emergency the moment it occurs. As “helping” agencies, their initial response is to provide whatever assistance they can with the resources they have available. Under this circumstance, it is clear that each agency’s ability to provide assistance was quickly exhausted. So too, was the ability to eventually document exactly what each agency, and each unit in each agency, did. Every attempt was made to clarify the number or amount of equipment and services, but in many cases "guesstimates" are about as close to accuracy as can be accommodated in this report.

LOS GATOS

Los Gatos, located in Santa Clara County, has a population of approximately 28,000 in an area of 12 square miles. It is an old, affluent community. There are buildings which date back to the early 1900s (old by California standards) and are considered to be of historical value. Most dwellings are wood frame constructed, and in excess of 2,000 square feet.

The community of Los Gatos receives fire protection from the Santa Clara County Central Fire Protection District (SCCCFPD). Los Gatos has three fire stations, three engine companies, a truck company, and an on-duty staff of 12. Chief Douglas Sporleder of the SCCCFPD is also the Fire Coordinator, responsible for all mutual aid in Santa Clara County. Most of the city of Los Gatos is served by a water delivery system, with the exception of the “Hills” area. The department has 159 career firefighters, all trained to the EMT level. There are 11 fire units on duty, nine engine companies, and two ladder companies staffed by 34 firefighters on duty. Emergency medical services is provided by a private company, PACMED. There are usually nine EMS units on duty for Santa Clara County.

When the earthquake struck, the communications system was quickly overwhelmed with the number of calls for assistance. At one time, they were 100 calls behind. The system was immediately out of control. There were numerous fires, injuries, and buildings damaged in the District cities of Los Gatos, Saratoga, Monte Sereno, Cupertino, and the unincorporated areas. Chief Sporleder mobilized the county mutual aid plan and requested five strike teams from the state mutual aid system (a strike team is five engine companies and one chief officer). These units were supplied from outside the Bay area. Within three hours, all off duty Fire District firefighters and officers had reported for duty to staff three additional reserve engine companies. In addition, the Department of Forestry supplied five strike teams in the “Hills” area.

The fires were being extinguished by the engine companies under directions from dispatch. After a while, the communications system became so overwhelmed that the officers were told to continue to respond to calls for service. Communications couldn't handle the number of radio transmissions associated with a normal fireground operation; there were too many fires. Chief Sporleder: “They had to get out of the ‘Mother, may I’ mode that fire units usually follow. They were told that when you are done with one fire, go to the next one you see, you don't have to tell us. The units also knew that there was no help available for them, they had to do the best they could with what they had. I didn't need to know how much medical assistance they rendered, I didn't have anyone available to document these actions anyway. They were given tremendous discretion. The company officers became independent operators in control of whatever they could see. They did an extraordinary job, each and every one of them; the firefighters, the officers. It showed me how well they were trained. They just went out and did it, over and over and over.”

Normal procedures were put aside. Officers were given the freedom to take initiative. Fire District executive staff were in the emergency operation

centers opened up in each of the four cities with Chief Sporleder in the county center as County Coordinator. Each city was given the latitude to establish its own priorities in the early hours of the event; later as problems decreased and became centered in the Hills area control shifted back to the county level.

As an engine company was fighting a fire, people in the area would congregate at the apparatus, looking for medical assistance. Someone in the crowd, usually a nurse or a paramedic, would identify themselves or offer assistance, and the officer would just give them the medical kit. Other nurses and paramedics came to the fire department and volunteered their services. They were given medical kits. Since the earthquake occurred at the end of the workday, fire prevention personnel were still at headquarters, and they were given several medical kits for their staff cars and responded to the medical calls.

Injuries were mostly the “walking wounded” type; there was no accurate count. Some people wanted comfort, or needed to talk about what had just happened, or wanted someone from the fire department to stay in the area “just in case.” Of course, the fire department couldn’t afford those amenities. The units had to move on, others needed their help.

The utility company brought people into the area right away. Gas and electric service was restored quickly. The area water system remained in place, but was weak. Operating units were not ‘getting the volume of water that they had been used to, but they still had enough water to fight the fires. The fires were not concentrated in one location but were spread throughout the Los Gatos area. By midnight, seven hours into the event, the fires in the flatlands area of Los Gatos had been extinguished, and the remaining fires were in the “Hills” area. It had gotten cold that night, and heating systems were turned on. Of course, the earthquake had damaged the chimneys, flues, and fuel lines on these heating

units. All of a sudden, there was another rash of fires near dawn. Engine companies continued to operate as they had all day.

As the number of fires in the flatlands diminished, and the fire problems were isolated in the “Hills” area, one unanticipated problem emerged. The “Hills” area just happened to have most of the reserve fire units operating there. The reserve units at that time were gasoline powered. The only fuel the fire department had stockpiled in the area was diesel. A quick request to the Santa Clara County purchasing department (logistics) got the needed fuel to the area. There were two lessons learned here.

Because the number of fires severely taxed the fire units, it was 12 hours (early the next morning) before the firefighters had opportunity to search collapsed and damaged buildings for victims. Search was conducted, door-to-door, throughout the city. No one was killed or injured, or still trapped. Most units found that people had conducted searches for their neighbors and had accounted for people long before the fire units had had the opportunity.

Building damage assessment was conducted by building officials from around the state. They had been summoned under the SCERP and OES plans. They examined buildings for structural stability and immediately made the determination as to whether a structure could be repaired or must be tom down. Building owners were informed that if a building had to be tom down they could contract to have it demolished themselves, or the city would contract to have it done and send the owner the bill. This type of heavy equipment is under contract to each city as part of the preparation plan under the section called “Operation Bulldozer,” which provides for heavy equipment when it is needed. Because these buildings were being tom down under separate, individual contracts, the “Operation Bulldozer” portion of the plan was never implemented.

Under the emergency plan, food was provided for fire personnel under contract from several fast food outlets. This part of the plan worked very well. About two gallons of water are carried on each fire unit as part of their equipment, so that hydration in the field did not become a problem.

Mutual aid units from out of the area were housed in the local armory. These firefighters had not brought toiletries, so toiletries were provided from the local jail which has them available for incoming prisoners. The jail also provided hot meals while mutual aid units were staged in the armory.

Once the area had been stabilized, fires extinguished, and dangerous buildings demolished, it was reported that there was tremendous pressure from certain members of the business community to permit them to reopen their businesses. The fire department was accused of being “too cautious.” Every attempt was made to allow business owners to retrieve important records, but no building was permitted occupancy until its structural integrity had been assured. The downtown area of Los Gatos was fully back in business within the year. Legislation required that the historical features of the destroyed or damaged buildings be preserved, and in some cases, that replication encumbered the restoration process.

WATSONVILLE

Watsonville is a community of 35,000 in an area of five square miles in Santa Cruz County. The epicenter of the earthquake was within five miles of Watsonville, about 60 miles southeast of San Francisco.

The fire department consists of two fire stations with 29 career personnel and 30 reserve. All career personnel are trained to the level of EMT. Six members of the department had received one week of heavy rescue training from

the State of California. When the earthquake struck, four firefighters were on duty in Station One and three at Station Two.

Initial damage assessment revealed that about 200 residences collapsed, and 14 major commercial buildings. The water supply was completely knocked out, but fortunately, the department had just filled its 5,000 gallon water tender which was then used to control the major fires. There were several gas main leaks, as well as numerous building service gas leaks. Fire Chief Gary Smith responded to the Emergency Operations Center (EOC) at City Hall and placed his Assistant Chief in charge of fire department operations. As Fire Chief, Chief Smith's responsibility in a disaster is City Operations Officer: to organize the EOC and facilitate meetings among the other ICS managers. Emergency power to the EOC had failed, so Chief Smith established a communications/command center in the City Hall parking lot. Emergency power was restored to the EOC within 90 minutes, and the city department heads and staff moved into the EOC.

Chief Smith called for one mutual aid strike team to assist Watsonville. Initially, there were six building fires and 300-500 "walking wounded" injuries. A local medical clinic became the collection point for these injuries: broken bones, lacerations, stress related chest pains, etc. By the end of this event, the clinic had treated over 1,000 people. There was one death, a woman approximately 50 years old, who either ran from or was pushed out of a bakery while trying to escape the building. A building parapet and some bricks fell on her; she died of multiple trauma injuries.

⁷ Chief Gary W. Smith, "Watsonville Among the Hardest Hit," Fire Command, Quincy, MA; National Fire Protection Association, December 1989, p. 22.

⁸ Ibid.

Getting the Watsonville, Fire Department personnel called back was not a problem. Once personnel were assured that their own families were safe, they reported for duty.

Watsonville had planned their responses to such an event. They had decided that since they were the only government agency properly trained and equipped to fight fires and deal with hazardous materials incidents, that these two types of emergencies would be a priority. Third on the priority list was EMS services, and fourth, rescue. Rescue was fourth because: 1) probably fewer people would be at risk than would be at risk by either a fire or a hazmat incident and 2) rescue from a collapsed building is never a “rushed” operation. This type of rescue requires more time and encumbers more resources during a time of critical shortages. Time, in a rescue, is not as critical as time in a fire or time in a hazmat incident when considering the numbers of people affected.

Once the major fires were extinguished, one team of firefighters assessed all collapsed buildings for structural integrity and the possibility of trapped victims. After seven hours of searching, it was determined that no one had been trapped. Fire companies that were available began to search for gas main leaks so that utility companies could be notified. Where and when possible, these fire companies controlled low pressure service gas leaks to buildings.

The next night, October 18, there were six aftershocks, one measuring 5.3 on the Richter Scale. Several fires started in mobile homes, and an additional strike team was summoned through mutual aid to assist in extinguishment.

Throughout the event, the Watsonville Fire Department responded to over 200 calls for service.

SANTA CRUZ

Santa Cruz is a community of 52,000 located in Santa Cruz County, covering an area of 11.1 square miles. The community has been described as one in transition from a retirement community to a college community. The University of California, Santa Cruz is located within its border. The city is also a tourist attraction, and a considerable portion of the city's economy is attributed to the tourist trade.

The Santa Cruz Fire Department (SCFD) is staffed by 47 career personnel trained to the level of EMT, and 22 on reserve status. There were three engine companies, with 12 personnel on duty the day of the earthquake.

When the earthquake struck, Fire Chief Ed Eakers called the duty Battalion Chief (as per plan) for an accounting of personnel and a status report on all units. Within six minutes he had all personnel and units accounted for and ready, and proceeded to the EOC at one of the local fire stations.

Within 12 to 15 minutes, he began to receive damage assessment reports from fire units, and he put the Emergency Operations Plan into effect. In total, there were 52 buildings destroyed, which included 212 separate businesses and 575 dwelling units (one-family homes to single room occupancies). There were minor disruptions to the water supply but no major water main breaks. A few lateral feeders were damaged but they were soon isolated and shut down. Electric power was lost immediately, and it was 18 to 36 hours before the private utility company completely restored service. There was one high pressure gas line rupture, requiring the evacuation of 75 homes. The utility company responded quickly, and everyone was returned to their homes within 24 hours. Many building gas service lines were severed, which caused problems with leaks and fires. Fire units and city public works personnel handled the shut-offs.

There were two major fires; separate single family dwellings which exploded and burned, probably caused by gas leaks There were 17 minor building fires, most ignited by leaking gas lines.

There was one major hazardous materials incident at the University of California, Santa Cruz (UCSC) chemistry building. The university summoned chemists from nearby universities, as well as their own professors, and UCSC handled the incident with assistance from the Santa Clara County hazardous materials response unit.

There were in excess of 500 injuries, 462 “walking wounded” treated at the local hospital, 36 transported by the fire department from the downtown area to the hospital, and 48 treated by fire department EMTs in the field. Three people were killed in building collapses in the Pacific Garden Mall.

The Pacific Garden Mall is not enclosed. It is an area of older “row” stores which have been remodeled. Several blocks of Pacific Avenue were closed off to create a promenade with trees, gardens, and benches. Initial reports of damage at Pacific Garden Mall to the EOC were major structural collapses, multiple buildings, many unsafe to enter, complete failure of walls, roofs, and floors. With that report, and upon suggestion of the Battalion Chief at the scene, Pacific Garden Mall became its own separate ICS. Chief Eakers requested mutual aid of three strike teams. The strike teams arrived within 25 minutes of the earthquake.

Pacific Garden Mall command became PACOPS. Depending upon the sizes of the buildings involved, the Incident Commander broke the entire area into divisions of three structures or three storefronts, each under a division commander. With that organization, PACOPS expanded to include 14 divisions. Each division had a supervisor and a five person rescue team. As each division began its own search and rescue operation (SAR), division commanders could

request assistance, if needed, from PACOPS: PACOPS continued the SAR operations until each building was searched, from top to bottom, three times PACOPS lasted for months the organization stayed in place as part of the recovery plan.

There were three deaths and one serious injury at the Pacific Garden Mall. One building had two deceased victims; the first was discovered immediately, the other required an extensive SAR operation. This required the shoring of an adjacent two story unreinforced masonry building, shoring of the collapsed building, and an extensive tunneling operation. SAR divisions used pre-fire plans to direct their tunneling operation; it helped them to locate exit-ways, and they tunneled along them. Canines from the police kept coming back with no indication that there was life present. After 30 hours, the body was recovered.

In the second building at the other end of the mall, witnesses had seen a woman alive in the rubble, and some had attempted to free her by removing debris. Earthquake aftershocks frightened them from their rescue attempt. The would-be rescuers showed the SAR division where the woman was located, and the division began digging and shoring. In the process, they discovered a different victim who was deceased, and continued on. It took about two and one-half hours, but the woman was finally removed. She suffered extensive leg trauma, and it was reported that one leg later required a below-the-knee amputation.

SAR operations went on throughout the night and the next day. The morning following the earthquake, additional canine units were requested to assist in the searches of buildings that were completely demolished. No additional victims were found.

The only episode that impeded SAR operations was a visit by President Bush on the day following the earthquake. His inspection of the damage included

a one-half block walk through the Pacific Garden Mall. The entire PACOPS SAR operation had to be shut down for four hours for Presidential security in order to accommodate this inspection, which delayed progress on the rescue operations.

All buildings that were of questionable structural integrity were evacuated, and by the second night after the earthquake, over 1,500 people were being housed in emergency shelters.

LESSONS LEARNED

The lessons learned include all three municipalities; where germane, specific places are mentioned. These lessons fall generally within three categories, planning, operations, and communications.

Planning

1. *Plan, plan, plan, and drill Quarterly in that plan.* Without exception, each municipality stressed this same lesson. The plans for the ICS and Mutual Aid were implemented without complication. All of those interviewed said that the drills helped establish a personal relationship with the other people involved in the emergency, and that reduced the stress associated with relying on the actions of another. They knew each other, had already worked with the plan, and knew what had to be done.

2. *Training of company officers and firefighters cannot be overemphasized.* Give them the guidelines within which to operate and let them operate. If they know what is expected of them, they'll perform. If you have the type of organization that severely restricts discretion, units may not handle independent decision making when it is required of them. Prioritize certain types of responses. For

example, in fire departments the number one priority was fire extinguishment because they were the only emergency agency equipped to perform that function, and if not handled, the situation would only get worse. The number two priority was Hazardous Materials Response for the same reasons. The number three priority was EMS, and the number four priority, rescue, because of the time factor, manpower, and equipment requirements.

3. ***If you have apparatus or equipment which requires special fuel or commodities, be sure to stockpile those commodities throughout the community, not just where those are presently stationed.*** This became a problem in the “Hills” area of Los Gatos. Gasoline powered units were operating in an area where only diesel was stockpiled. The gasoline was stockpiled where the units were assigned, not where they were operating. Spread out your resources stock
4. ***Prepare for long operations. Identify where you can get large quantities of food and potable water.*** Remember that your water system may be contaminated. Units cannot boil water in the field. Jails and fast food restaurants were invaluable sources of supplies. This had been planned.
5. ***Prepare a policy statement which gives call-back guidelines to off duty emergency personnel when it is impossible to communicate with them.*** Designate a place to which called-back emergency personnel should respond in a major disaster. When these disasters do occur, it is almost impossible to institute a call-back of personnel. There’s simply too much going on. If personnel know where they are to report, and what is expected of them, it simplifies the process of mobilizing them.
6. ***As much as possible, make fire stations, police stations, and ambulance stations self-sufficient.*** Stockpile food and potable water. Make sure they have

emergency backup generators Permit them, within certain guidelines, to operate as independent units when communications with them is impossible.

7. *Identify local sources of secondary water supplies.* When a community's primary water distribution system is destroyed, that second source is invaluable. One community had a 5,000 gallon tanker on reserve.

8. *Plan the use of volunteers.* Decide, as part of your plan, how volunteers will be used. Sometimes, volunteers won't show up for two or three days. It happened that one municipality planned for volunteers on the first day, and no one showed up. The volunteer liaison, and associated plans and organization were dissembled. Three days later, they had almost 100 volunteers, and no organization within which they could assist. The problem here could be that the volunteers will then decide to act on their own.

9. *If the emergency is an earthquake, get all emergency equipment and vehicles out of buildings until their structural integrity can be assured.* There is a distinct possibility that all of your emergency equipment and vehicles could become victims of the earthquake. Make plans, and train your departments to get this equipment and vehicles outside until the structural integrity of the building can be assured. Also make contingency plans should your equipment and other resources become unavailable due to damage.

10. *If structurally sound, fire stations can serve as shelters, points for water and food distribution, and information centers.* They are usually located throughout a city, and people know where they are located in the neighborhood. Because of the availability of emergency generating power and communications, fire stations can quickly receive and disseminate information that would ordinarily be

unavailable. Outside speakers can be attached to the station's public address system.

11. *The short term effects of the earthquake are obvious, but there also some severe long term effects:*

- The city of Santa Cruz usually experiences an employee turnover rate of about seven percent a year. In the first year after the quake, the turnover rate was 40 percent. It seemed that these employees couldn't do anything that wasn't related to the earthquake. Every meeting, every purchase, every decision was either about the earthquake or its consequences. Many were just "burned out" from dealing with the same problems and the same issues again and again.
- Small earth tremors in the area are common, and more or less something that natives to the area get used to. Since the earthquake, even minor tremors precipitate panic, numerous emergency calls, and need for reassurances.
- Anything related to the earthquake is still a topic of local conversation or activity. Even after two and a half years, when one damaged building was demolished, a crowd gathered and some people were crying.

These three examples may point to the need for more examination of the psychological impact of mass casualties and destruction on a community.

Operations

12. Consider the possibility that you may have to act autonomously, that an event affecting an entire region may diminish the availability of mutual aid. Eventhough you are a part of a large mutual aid pact, during these types of events, you will probably be “on your own” for a while. That means that you must develop local contingency plans which resemble your regional or state plans. Drill in these local contingency plans. Identify local resources

13. Call for help quickly and aggressively. Don't think that you're alone, or that others may be worse off than you. Continue requests for help that remain unfulfilled. During this event there were agencies willing to help and available in outlying areas. They were anxious to assist, but did not do so because they hadn't been asked. Municipalities which desperately needed assistance didn't ask for help because they felt that others were in greater need. Ask for help. If it can't be provided, you'll be told.

14. Expanding the Incident Command System from a central command post doesn't always work. You must be flexible. The volume of calls for assistance overwhelmed the system, and organizational resources were quickly exhausted. Much like the riots of the sixties, units sometimes have to do the best they can with what they've got. The volume of radio traffic may prevent units operating in the field from reporting back to a central command post, or reporting their activities and progress. There's simply too much radio traffic. In a way, each becomes their own incident commander.

15. Emergency worker safety is the highest priority. These are the people who can do the most good for the most people. Undue risks to their own personal safety not only jeopardizes their lives, but the lives of so many others.

16. *If you get volunteer assistance, use it. Provide volunteers with whatever tools you have available to assist them.* Do not give out equipment that you may need for operating units, but on the other hand, do not be so proprietary that you ignore their valuable assistance.

17. *Work with your utility company.* Decide beforehand which types of emergencies you will handle, and which emergencies the utility will handle. For a while, one fire department and one utility company were responding to the same types of utility emergencies. It was decided to allow the utility to handle the “big” leaks and problems, and the fire department the smaller ones.

18. *Citizens want comfort, they want someone with a badge to take charge, they are leaderless.* Even when there is no immediate need, people want someone there ‘just in case.’ They have to tell someone “in charge” what happened to them, in detail. A few units responded to this need and were quickly overwhelmed. Make sure units remain focused on their assigned tasks.

19. *Some of your problems will be "people" problems not "thing" problems.* Police, fire, and EMS are prepared to deal with emergent situations, not long term problems. The problems of shelter, clothing, and non-emergency medical care fell on the shoulders of these emergency workers because they were “in charge.” In your plan, take advantage of those local agencies that are used to performing this type of work and ask for their participation in planning and in operations. For example, when donated clothing and food came into one area, the EOC attempted to distribute the material. They soon realized that they weren’t going to be as good as the Red Cross and Salvation Army in doing this. Services were duplicated in some areas and non-existent in others. The EOC decided to supply these agencies with the food and clothing and allow them to

distribute it to those in need. They have since been included in the disaster planning process

Communications

20. *Communications in these types of situation will be your Achilles Heel.* Calls for assistance from all over the city, calls for mutual aid from surrounding communities, calls for help backed up waiting to be answered, units operating in the field reporting their progress and availability, other units calling for help, and difficulty in assessing the magnitude of any one incident as compared to the others in progress were just some of the problems. The most valuable tool was cellular phones. One cellular phone company gave the fire department a number of cellular phones for emergency use. Investigate this availability, it should be part of your plan. Cellular phones also permitted emergency personnel to call and inquire about the safety of their own families, a very important detail to consider.

Santa Cruz established a mobile communications repair unit which went into the field to repair broken equipment. The unit used computer information about prior equipment repairs to predict probable breakdowns. These data also helped the repair unit order parts.

21. *Disaster Plan/Mutual Aid communications protocol should closely resemble day to day communications.* Santa Cruz found that the emergency plan communications were different from their day to day intradepartmental radio communications. When planning, this didn't appear to be a problem. Under the stress of the earthquake, units fell back on the communications they knew best. It made communications with mutual aid units difficult.

22. *Cellular phones, while invaluable at these incidents, are not the panacea.* Cellular telephone technology is rapidly improving, and as a result, more and more people have them. The technology is based on the availability of “cells” to make and receive calls. When regular telephone service is nonexistent, people will fill cellular telephone “cells,” making their emergency use almost impossible.

23. *There must be a close link between the political and administrative arms of government and the emergency response arms of government.* Mayors may be required to make or establish broad areas of policy. Frequently, elected officials were making promises that emergency services couldn’t deliver. Sometimes, decisions about whether to act or not had possible litigious consequences.

24. *Within the ICS, the Public Information Officer is critical.* It was sometimes impossible to communicate with every resident, and rumors were rampant. Each municipality included the PIO in every meeting or debriefing session. Information disseminated was timely, accurate, and unequivocal. This was effective rumor control. In Santa Cruz, the PIO staff also had the responsibility of contacting emergency workers’ families to assure their safety, and inform them of their emergency worker’s safety. In cases where phone service was cut, the fire department sent a staff car to the home. In every case, the problem wasn’t finding the family, it was finding the emergency worker.

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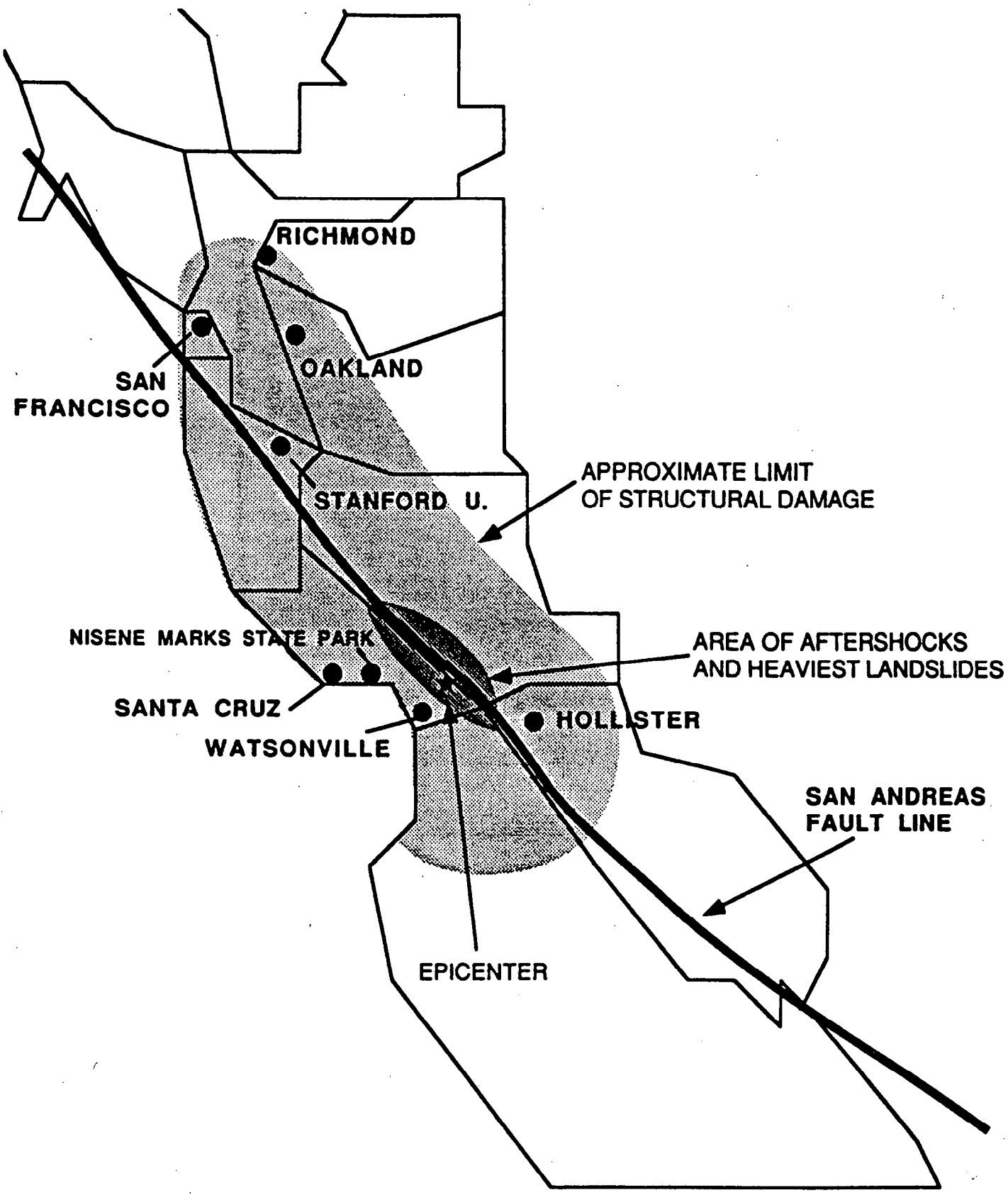
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Appendix

Map of Region Showing Relation of Santa Cruz Area to Epicenter



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