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**The Federal Response  
to the California Earthquake of February 9, 1971:**

**An Interim Report as of May 20, 1971**

**EXECUTIVE OFFICE OF THE PRESIDENT  
Office of Emergency Preparedness**

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## 1. INTRODUCTION: A New Law and an Early Test

New Year's Day 1971 marked the beginning of basic changes in the Federal Disaster Assistance Program--changes destined to be put to the test in a momentous way only 40 days later in one of the most disruptive and expensive major disasters in the history of the program: the California earthquake of February 9, 1971.

For 20 years, the underlying law providing for Federal Government assistance in "major disasters"--that is, those determined by the President to warrant financial and other aid for relief and recovery--was Public Law 81-875, the Federal Disaster Act (September 30, 1950--64 Stat. 1109). Twice, major additions to the assistance program had been legislated, by the Disaster Relief Acts of 1966 and 1969 (80 Stat. 1316 and 83 Stat. 125 respectively), but "P.L. 875" remained the basic authority, as well as a part of the language at all levels of government.

Then Congress passed the Disaster Relief Act of 1970--Public Law 91-606--completely replacing P.L. 875 and expanding the concept of Federal assistance still further. President Nixon signed the Act into law on December 31. Thus the Federal Government began 1971 with new powers and responsibilities for aiding State and local governments and individual victims in major disasters.

The implementation of any new law, but especially one substituted for a basic statute, is normally a lengthy process. Authority must be delegated, responsibilities assigned, procedures developed, regulations promulgated, guidance written, briefings conducted. And all this is usually tested, evaluated, and refined over time. For P.L. 606 (the new key word in the disaster lexicon), these administrative necessities benefited from a good head start, in anticipation of the new law. Executive Order 11575, Providing for the Administration of the Disaster Relief Act of 1970, was issued by the President at the same time he signed the Act. The Director of the Office of Emergency Preparedness, responsible under Presidential delegation for administering the specially appropriated President's disaster funds and for managing the Federal Disaster Assistance Program, by January 22 had issued new regulations (substituting a new Part 1710 for Parts 1710, 1711, and 1715 of Title 32 of the Code of Federal Regulations--effective upon publication in the Federal Register, Vol. 36, No. 19--January 28, 1971). The detailed, time-consuming tasks of

revising and reissuing OEP directives and of briefing governors and other officials on the program changes were also well underway before P.L. 91-606 was 40 days old.

Then came the test. The earthquake that shook the Los Angeles-San Fernando area of California on the morning of February 9 was to make full use of the new law and to require optimum application of Federal capabilities and resources.

This report summarizes the myriad measures taken by the Federal Government to supplement the efforts of the State, Los Angeles County, the affected communities, the voluntary relief organizations and many others to relieve the suffering and deprivation brought about by the quake, to restore the stricken area and its people to predisaster normalcy, and to apply the lessons of this experience to reducing vulnerability and improving recovery in future disasters.

By now, the emergency relief phase has passed into the long period of rehabilitation and recovery, wherein most of the Federal effort takes place. Thus this account of the first 100 days after the earthquake is by no means the whole story of the program in this disaster; that remains to be told after many more months, many more man-years of technical assistance, many more millions of grant or loan dollars. But this point in time serves well for looking back on what has been already done and ahead to what has been merely begun.

## 2. THE TOLL: Casualties and Damage

The temblor came as unexpectedly as possible in quake-prone California; the first tremor was the worst. Its 6.6 magnitude was only "moderately severe" by earthquake ratings, but its toll was large: 64 dead, more than 1,000 injured, and probably more than a half billion dollars total damage.

On both counts, casualties and damage, it could have been far worse. At 6 a.m., most of the population was still at home, the highways still largely free of rush-hour traffic. With the epicenter in Soledad Canyon, the shocks were borne more by smaller outlying communities than by the more densely populated Los Angeles urban area. And the Van Norman Dam, though damaged, held. Destruction from the many-score, long-continuing aftershocks was relatively negligible.

Nevertheless, this was indeed a catastrophe to those in the affected area. Two structures at Sylmar were the worst hit: the 45-year-old Veterans Administration Hospital and the newly built Olive View Sanatorium. The center wing of the Veterans Hospital collapsed, burying patients and personnel under tons of debris. Some survived, including one man trapped for 58 hours, but 46 died instantly or were fatally injured there. Other parts of the building seemed unscathed on the exterior but were extensively damaged within. This destruction pattern was similar at Olive View's main hospital, despite its earthquake-resistant construction. The six-story structure and two older buildings were wrecked; others remained standing but were heavily damaged. Three persons were killed there.

Hospitals and schools seemed to bear the brunt of the earthquake's destructiveness. In addition to \$27 million for the Veterans Hospital and nearly \$36 million for Olive View, damage to 17 private hospitals and convalescent homes was assessed at \$15,719,000. School damage has been calculated as even higher, if replacement costs are considered, for three State higher education institutions, 10 community colleges, and scores of elementary and secondary schools in the Los Angeles City and County systems.

Damage to highways and to public utilities was extensive, with collapsed overpasses and buckled pavement, broken mains and downed lines. Most seriously affected were the Sylmar Power Converter Station and the Van Norman Dam and Reservoir. Federal Aid System roads incurred an estimated \$16.8 million damage, and non-FAS streets, roads, and bridges another \$5 million.

Of the area's communities, the City of San Fernando suffered the most damage to private property--an estimated \$22.5 million in real property, personal property, and inventories. In downtown Los Angeles the Midnight Mission collapsed and several other structures, including some high-rise buildings, received heavy damage. Other areas most affected included Newhall, Saugus, and Honby.

OEP estimates total damage to private property as approximately \$270 million. With public property costs included, the destructiveness of this earthquake ranks it among the costliest disasters in the Nation's history, despite the relatively low loss of life and the limited number of collapsed structures.

### 3. THE DECLARATION: The Need and the Promise

Just as there are many kinds of disasters, there are many ways of instigating the Federal Government's response to those situations requiring its assistance. Generally, that response reflects the urgency and severity of need in the disaster. Some Federal actions may even precede a disaster occurrence, when warning provides sufficient time and the circumstances permit advance measures. Often, the financial aid available from the President's fund--or even the applicable assistance of other agencies--is not immediately needed and is provided days or even weeks after the event. But when the gravity of the situation warrants, the Federal Government can act instantaneously. Such was the case in this earthquake.

Most Federal agency personnel in Washington had just begun their workday when the first, fragmentary reports of the earthquake were relayed from the West Coast--where it was barely 6 o'clock--by news services and Government communications systems. Initial messages merely estimated the quake's magnitude and location. While tremors in California are not uncommon and the early, sketchy reports said nothing of damage, the Office of Emergency Preparedness moved quickly to assess the situation and alert other agencies. OEP Region 7 Office personnel were on the scene almost immediately. When word was first received about the destruction at the Veterans Administration Hospital and Olive View Sanitorium, the existence of a grave disaster became apparent.

Within hours, Governor Reagan, with the assistance of the OEP Region 7 staff and the California Office of Emergency Services, requested that President Nixon declare a "major disaster." The President, alerted to the situation in advance, did so at once. The usual paperwork had been expedited or left for later attention. California, previously beset by flooding and fires for which Federal aid was being supplied, had no difficulty qualifying in this disaster. Triggered by the President's action were the many kinds of help provided through the Federal Disaster Assistance Program, including grants from the President's Disaster Fund, as well as other Federal aid programs applicable in a "major disaster."

Acting for the President, and as a part of his Executive Office, OEP is responsible for directing and coordinating all Federal relief and recovery efforts in this disaster.

OEP also administers the President's Disaster Fund. OEP Director G. A. Lincoln immediately designated Los Angeles County as the disaster area eligible for assistance and named OEP Region 7 Director Ralph D. Burns as Federal Coordinating Officer for disaster operations. A Disaster Field Office was then opened in Los Angeles at 107 S. Broadway.

With the cooperation of Los Angeles County, OEP set up six Disaster Assistance Centers in the affected areas, at Sylmar, San Fernando, Newhall, Los Angeles, Pacoima, and Granada Hills. Manned by State, local, and Federal Government officials and relief organization personnel, these neighborhood-oriented centers made it possible for those in need to contact the many sources of help--and for those with aid to reach the disaster victims--more quickly and easily. A mobile unit was also in operation for this purpose.

In directing actions at the headquarters level in Washington, OEP made full use of its recently established facility specially designed for such emergencies. Director Lincoln was further able to assure a coordinated response through his chairmanship of the National Council on Federal Disaster Assistance, a high-level committee of at least 11 agencies, which the President had set up by Executive Order 11526 (April 22, 1970).

On the day after the quake, OEP Director Lincoln accompanied Vice President Agnew on an inspection of Federal assistance activities in the stricken areas. OEP and several other agencies augmented their disaster-area staffs with personnel from headquarters and other field locations.

The adequacy and alacrity of the Federal response in the period immediately after the disaster varied from agency to agency. On the whole, however, aid programs were quickly implemented.

Under the direction of the Federal Coordinating Officer, P.L. 91-606 activities have included direct Federal assistance by contractors in hazard demolition and debris removal, search and rescue, evacuation, and repair or restoration of public facilities. Throughout this effort, the Federal Coordinating Officer has worked closely with the local and State agencies principally responsible for disaster operations.



#### 4. THE FIRST DAYS: Care and Safety

The immediate needs of the earthquake victims were met largely through the work of the American National Red Cross and other relief organizations, with Federal Government cooperation and assistance.

The Red Cross established seven emergency welfare centers to care for those families whose homes had been condemned. In the first week, the Red Cross had served 175,000 meals. By March 9, one month after the quake, activity at the centers was decreasing and all mass feeding centers had been closed. The Red Cross had provided assistance in 12,000 cases, with an expenditure of \$1,066,440. Mass-care costs in feeding and sheltering 17,000 persons approximated \$100,000. The Salvation Army also operated mobile feeding units for victims and relief workers. The U.S. Forest Service not only made available 2,000 disposable sleeping bags but also opened a field kitchen in a San Fernando church. The U.S. Department of Agriculture supplied foodstuffs for the Red Cross and Forest Service units.

The shortage of drinking water in areas where mains had been ruptured was alleviated by the use of huge tank trucks provided by local government, industry, and the Army National Guard, often in conjunction with the Red Cross centers.

Information on Federal assistance available was developed by OEP and distributed at the Red Cross shelters and stations and the neighborhood disaster centers, through the mobile units, and in some areas even by door-to-door delivery.

Local anti-poverty agencies under the supervision of the Economic and Youth Opportunities Agency of Greater Los Angeles (EYOA), which is funded by OEO, provided immediate assistance to poverty families affected by the earthquake in the towns of San Fernando, Pacoima, and Sylmar. Their assistance consisted of the distribution of goods such as food, clothing, emergency supplies (including 1,000 Red Cross blankets), and counselling, informational, and referral services to ensure that the disaster stricken poor, who were largely from Mexican-American and black minority neighborhoods, obtained the relief being made available. The agencies--Joint Venture and the Neighborhood Adult Participation Project--utilized VISTA volunteers, legal services lawyers, and volunteer workers from the poor community in addition to their regular staff.

By authorizing the expenditure of additional funds by these delegate agencies, providing them with technical assistance, and coordinating their efforts with disaster relief agencies such as the Red Cross, the EYOA and the OEP Region 7 Office attempted to focus attention upon the needs of the poor and to facilitate the delivery of relief to them. Perhaps the best example of such cooperative efforts in meeting these needs was the quick organization of an emergency center at the Santa Rosa Church in the Mexican-American barrio of the San Fernando Valley, where thousands of poor disaster victims were fed and cared for. Such efforts constructively overcame cultural, language, and socio-economic barriers which in the past have tended to inhibit or obstruct the delivery of disaster assistance to poor minority families.

Nondiscrimination provisions of P.L. 91-606 have been enforced and legal services for low-income families arranged.

Use of Federal food stamps for disaster victims was begun by the Department of Agriculture on February 22, after resolving uncertainty over the need for that program.

Area hospitals, despite damage to several, were able to handle the earthquake casualties, and no medical emergency existed. The smoothness of this operation is attributable largely to an emergency radio network linking hospitals in the County. The greatest single need for casualty care was in relation to the collapse of the Veterans Hospital, where rescue operations continued for several days. Federal action was immediate. Within the morning of "quake day," with OEP's approval the U.S. Army Corps of Engineers had contracted for men and equipment and begun the effort to uncover trapped survivors and bodies. The Army, Air Force, and Marines each supplied a helicopter and crew for emergency needs.

Along with the Veterans Hospital rescue effort, the most dramatic aspect of the first few days after the quake was the threatened break in the Van Norman Dam. Had the dam given way, several billion gallons of water--"a battering ram 10 feet high and 1/2 mile wide," as an OEP report described it--would have rushed out unchecked for 6 miles.

Within half an hour of the damaging tremor, engineers of the Los Angeles Department of Water and Power began lowering the reservoir waters to a safe level. This time-consuming process was aided by installation of supplementary pumps by the Corps of Engineers on February 11. Meanwhile, the risk remained, so an evacuation was soon ordered by the police. Alerted by radio, television, and the police, almost 80,000 residents of the Granada Hills area below the dam left their homes on February 9 until the safe water level was reached

3 days later. A disaster potentially far more catastrophic than the quake itself had been avoided.

Cost of this evacuation and of other protective, health, and sanitation measures reimbursable by the Federal Government totalled an estimated \$2 million. Expenditures for debris clearance were expected to approximate \$2 million for public property and \$3 million for private property.

Debris clearance, assigned by OEP to the Corps of Engineers, for this disaster involved not only the usual removal of wreckage but also the wrecking of standing structures. While collapsed buildings were few, many were so badly damaged as to be unsafe for occupancy. The Corps has already demolished or will soon remove as many as 300 buildings, public and private, mostly in the cities of San Fernando and Los Angeles.

## 5. HOUSING: Temporary Homes and Long-Term Loans

After the massive rescue, evacuation, and mass care operations, first priority went to housing the earthquake's victims. OEP figures showed 875 individual dwelling units destroyed or condemned in the disaster area, with an additional 1,201 families made homeless because of uninhabitable conditions in multiple dwelling units.

To meet these needs, all available Federal housing was used; Veterans Administration units were the first to be assigned. Local real estate boards, apartment owners associations, and individual homeowners offered units to the Department of Housing and Urban Development, to which OEP assigned this responsibility. Temporary housing requirements for earthquake victims are nearly completed. By May 25, HUD had housed 1,104 families. (In all, HUD had received 1,912 applications; 221 were ruled ineligible, 550 were withdrawn, and only 37 applications remained in process--all from persons who already had some satisfactory interim accommodations.) Ninety former renters are being permanently relocated and their disaster rental assistance will be terminated shortly.

The greater portion of temporary housing requirements has been met by HUD lease of privately owned rental properties than by use mobile homes. This was done in accordance with local and State governments' desire to maximize occupancy of local real properties, thus lessening the export of disaster relief funds out of the community.

The quake left a far greater number of homeowners with habitable but damaged dwellings. Since residential damage was heaviest in middle-income areas, some families faced large repair bills on top of their regular mortgage or rent payments. One provision of the new P.L. 91-606 provides a remedy for the most severe cases in the form of temporary mortgage or rent payments for those in jeopardy of losing their residences because of financial hardship as a result of the disaster. This OEP program, financed from the President's Disaster Fund, is managed by HUD. At least 23 families have been so aided to date.

Homeowner loans are available for disaster victims from the Small Business Administration. As of May 25, SBA had accepted 11,943 home loan applications, totalling \$46,702,446, and had approved 10,746, for \$40,870,271. Actual disbursements by that date exceeded \$19 million. With 207

applications declined and 26 withdrawn, only 970 remained pending. (To handle this huge volume of requests, SBA augmented its Southern California staff with several hundred specialists flown in from at least nine other locations throughout the country.)

Under P.L. 91-606, a homeowner (or businessman) who has sustained \$4,000 damage--the average type of loan in the disaster area--is able to borrow that amount for a 10-year period at the current interest rate of 5-1/8 percent, take advantage of SBA's current \$2,500 "forgiveness" benefit, and owe only a \$1,500 principal balance. Furthermore, the Red Cross has provided grants of up to \$500 to those victims with limited income to help them qualify for at least a minimum \$3,000 loan and the forgiveness benefit.

In instances where uninsured damage exceeds 50 percent of property value, in addition to covering the cost of rebuilding, the SBA loan may include funds to apply to any existing mortgage. Thus, a \$30,000 home with a \$20,000 mortgage and damage of another \$20,000 would be eligible for a \$40,000 loan that would take care of both obligations. Such a loan, financed for 30 years and also carrying the \$2,500 forgiveness advantage, would require payments of \$204 per month, compared with approximately \$180 per month that is typically being paid on such property.

To help homeowners make the most of these Federal assistance programs, SBA has notified HUD of all SBA loans of \$5,000 or more, so that HUD can inform these individuals of its programs, including temporary housing.

## 6. PUBLIC FACILITIES: Repairing and Reopening

While a safe residence may be paramount to the individual victim in a disaster, he soon finds that is not enough; normal life in a community requires water and power for his home, communications means and transportation routes, schools and hospitals, stores and offices. Earthquakes are particularly destructive of underground utility systems and roadway grade separations; this temblor was no exception. What was worse, it also wrought especially severe havoc--largely by chance--upon medical and educational facilities in Los Angeles County.

One of the first Federal tasks, by the Department of Health, Education and Welfare, was to assess the damage to schools and hospitals, in order to determine what Federal funding would be needed for repair and maintenance of operations. HEW inspected 18 hospitals and 334 schools.

Costs to restore State higher-education facilities can be met by OEP from the President's Disaster Fund. These are anticipated to total \$458,839 for three institutions (UCLA \$256,404, San Fernando Valley State College \$199,084, Los Angeles State College \$3,331). Ten facilities of community colleges appear to be eligible for direct funding by HEW's Office of Education, and \$157,884 has been provisionally authorized for them. Another \$4,473,905 has been provisionally authorized by HEW for the Los Angeles County and City school systems (\$667,075 and \$3,806,830 respectively) under Public Laws 81-874 and 81-815. Actual applications from the school systems, as of May 20, totalled \$4.1 million, with \$1.2 million paid to date.

The Veterans Administration has reached no decision as yet on whether or where to rebuild the Veterans Hospital. The original contract cost for the Olive View medical center was about \$36 million, and the cost of replacement may be eligible for payment from the President's fund. Legislation has been introduced in Congress to allow funding for repair of the private nonprofit hospitals damaged in the earthquake.

Repairs to the San Fernando Juvenile Hall in Sylmar are estimated at \$6 million. Federally financed repairs and related equipment for other public buildings may cost another \$3 million.

Funding requirements for repair or replacement of public utilities are estimated at \$14 million for the Sylmar power station, \$34 million for the Van Norman reservoir-dam facilities, and \$20 million for other sewer, water, and electrical distribution systems. The Pacoima Dam may require

\$1.5 million for repairs, while another \$800,000 is anticipated for work on debris basins, disposal areas, channels, and storm drains.

Restoration of water and sewer facilities for the City of San Fernando received priority from the Corps of Engineers. The Corps had restored temporary water service to all of San Fernando by February 21 and sewer service, on an emergency basis, by March 12. Damage to utilities was surveyed by the Corps of Engineers and the Environmental Protection Agency, in cooperation with State and local engineers. This survey work is essentially complete.

The final phase of Corps of Engineers' effort--and the major one in terms of time, money, and manpower--is the OEP-directed repair work for San Fernando and for Los Angeles City and County. Permanent repairs in the more heavily damaged areas will take several months.

For all its tasks, the Corps of Engineers has awarded 26 contracts with a total value of \$3,825,819. Eight, totalling \$2,532,278, have been completed. Another 61, amounting to \$9,850,000 have been proposed. Corps work has included repair or replacement of 23,730 feet of water lines, inspection (by television) of 400,000 feet of sewer lines and repair or replacement of 5,100 feet, testing and restoration of seven wells, and rehabilitation of five reservoirs.

The Los Angeles area is noted for its extensive and complex system of freeways. This, too, fared badly in the earthquake, with interchanges particularly affected. The Golden State Freeway incurred severe damage where it intersects with Interstate highways 405 and 210. Twelve major overpasses collapsed.

Engineer teams of the Federal Highway Administration made field inspections throughout the disaster area, and FHWA contractors and the State constructed temporary detours for I-5 and California Route 14. Reconstruction of the damaged roadways and interchanges will require many more months.

Roads and bridges which are part of the Federal Aid System will be repaired or rebuilt with Department of Transportation funds. Those not part of the Federal system are eligible for repair through the President's Disaster Fund.

## 7. THE ECONOMY: Business and Jobs

Red Cross figures indicate that 145 small businesses were struck by the earthquake: 29 destroyed, 49 with major damage, 67 with minor damage. Yet the City of San Fernando reported 123 commercial units "unsafe." (No major firms were seriously affected.) Many others were economically injured, even if not physically, because of disruption of supplies, services, and sales.

The principal source of aid to these establishments is the Small Business Administration's disaster loan program (which applied to homeowners as well) under Section 231 of P.L. 91-606. As of May 25, SBA had accepted 908 business loan applications, totalling \$28,060,848, and had approved 601, for \$13,472,754. Five had been withdrawn and 47 declined, leaving 255 to be acted upon.

Under Section 237 of P.L. 606, SBA is authorized to provide a loan to any industrial, commercial, or other enterprise which has constituted a major source of employment in a major-disaster area and which is no longer in substantial operation as a result of such disaster. The loan amount can be as much as necessary to enable resumption of operation. Like the mortgage assistance provisions of the Act, this is a new aid activity, and precise criteria on eligibility had not been developed. This fact delayed implementation of the program after the earthquake, but SBA did accept applications under this section.

The earthquake, of course, affected employees as well as businessmen. Many were left jobless because of the disaster's effect on their places of employment, aggravating an already high unemployment rate. San Fernando, for example, reported 2,000 jobless.

Under P.L. 91-606, unemployment compensation can be made from the President's fund to those who have lost their jobs because of a major disaster. By delegation from OEP, the Manpower Administration of the U.S. Department of Labor has the responsibility of paying disaster unemployment assistance claims through affiliated State Unemployment Insurance offices. OEP had allocated \$600,000 to the Department by May 17 and has since provided another \$100,000. As of May 18, claims received totalled 4,567 in number and \$366,269 in value.



Several training programs funded by the Manpower Administration were available to help unemployed in the disaster area.

Under Section 165(h) of the Internal Revenue Code, special tax treatment is afforded victims of major disasters. Since the earthquake occurred between January 1 and the April 15 date for filing, taxpayers could claim their casualty losses on their 1971 returns. This meant many might get refunds on monies already paid in through withholding tax. The casualty loss program is complicated, but the Internal Revenue Service provided guidance to taxpayers in preparing or amending their returns.

The economic effects of disaster upon businesses and their employees--loss of income, decline in sales and purchases, tax writeoffs--in turn can hurt the community by reducing its tax base. San Fernando estimated a 20-to-30 percent loss of its property tax base in the first year after the earthquake. Payrolls in the immediate area were down by some \$2 million a week, which also meant less from the sales tax, which normally provides half of the city's revenue.

To offset this situation, Section 241 of P.L. 91-606 provides for community disaster grants to any local government which, as the result of a major disaster, has suffered a substantial loss of property tax revenue (both real and personal). Grants may be made for the tax year in which the disaster occurred and for each of the following two tax years. OEP met with city officials of both Los Angeles and San Fernando to consider assistance under this section. Local governments will not, however, be in a position to apply for these grants until they know the amount of reduced tax revenue compared to the average for the 3 years prior to the disaster.

Another aid source for a disaster-stricken community is the Economic Development Administration. The Secretary of Commerce can designate an area as a Redevelopment Area due to a "sudden rise of unemployment." (There must be an increase to 50 percent above the national average.) Assistance then available--under P.L. 89-136, the Public Works and Economic Development Act of 1965--may include business redevelopment loans, public works development loans, technical assistance for economic growth planning, and public works loans or grants. This program was under consideration for San Fernando.

## 8. DIAGNOSIS: Studies and Analyses

This earthquake promises to be the most thoroughly scrutinized and analyzed "major disaster" in the history of the Federal Disaster Assistance Program, with the purpose of learning more about the causes and effects of earthquakes--and disasters in general. The conclusions to be drawn from these many and varied studies will hopefully lead to earlier warning, stronger protection, faster reaction, better communication, tighter coordination, and--perhaps most importantly--more adequate and responsive assistance programs to alleviate human suffering, economic loss, and social upheaval.

At the Federal level, some studies have been concerned with the human aspects of the earthquake, others are on highly technical matters such as earth movements and construction. Some have been sponsored by OEP on behalf of the Federal Disaster Assistance Program, others have been at the initiative of the agencies involved.

One study for OEP was made of the Van Norman Dam Evacuation, which offered applications to other disaster-threat situations and even to preattack measures. A three-man team from OEP and the National Weather Service examined in detail the predisaster planning as well as the decisions and actions of the evacuation itself. The report praised the Los Angeles Police Department in particular and pointed to "the flexible, coordinated planning and the well-trained, competent men of the organization involved" as the keys to the evacuation's success. An adjunct report by a team member treated the citizen reaction and the communications media role in the evacuation and in the disaster generally. Several specific recommendations were submitted with both reports.

Another OEP-organized team assessed the adequacy of medical support during the disaster. Led by the OEP Health Advisor and including members from other Federal health and medical agencies, the group contacted the principal organizations and individuals active in the medical aspects of the earthquake. The team's report dwelt heavily on planning and communication, recommending several improvements in those areas. The local hospitals' radio net drew special praise.

The economic impact of the earthquake was examined by the Public Administration Service under an OEP contract. Selected areas explored were the effects on the middle-income citizen, on private nonprofit hospitals, and on public works under construction by private contractors. These were problem areas cited in post-earthquake hearings by a subcommittee of the House Public Works Committee. The PAS study's findings and suggested courses of action should influence improvements in disaster assistance.

Another subject covered briefly by this report is earthquake insurance. According to Red Cross data, only one percent of homeowners in the area had such insurance, which has a lower premium rate but a higher deductible than Federally supported flood insurance. The Federal Insurance Administration, which, with President Nixon's task force on disaster insurance, has been considering such a program, also inspected the Los Angeles quake area, particularly as to land-use patterns and State and local structural requirements.

A brief but broad-ranging report by the Joint Panel on the San Fernando Earthquake, National Academy of Sciences-National Academy of Engineering provided significant observations of "lessons learned" in scientific, engineering, and human areas of concern.

At OEP's request, the National Bureau of Standards made an engineering study of structural damages. Its interim report offers graphic evidence of the kinds of damage found. A detailed report is expected by the end of June.

Other technical studies and investigations include:

- \* National Bureau of Standards - structural analysis of damaged Federal buildings and recalibration of instruments in defense industries;

- \* Corps of Engineers - collection of information regarding changes that transpired in the soil as a result of the earthquake;

- \* Bureau of Public Roads - investigation of failures of interstate highways and overpasses on the Federal Aid System. Much of this work will be dependent upon the results of the soil movement studies;

\* National Oceanic and Atmospheric Administration - collection of data from hundreds of instruments in the area that measured the response of buildings during the earthquake;

\* U.S. Geological Survey - various technical and "pure science" studies on such topics as seismology, gravity, and ground water.

(The last two cited above are reflected in Geological Survey Professional Paper 733, a joint report by the two agencies. See the list of references at the end of this report.)

On May 25, OEP and the Department of Commerce announced a new and potentially far-reaching study to assist the Government in earthquake-disaster planning. The National Ocean Survey of the National Oceanic and Atmospheric Administration, in collaboration with OEP, will undertake an 8-month study of the effects of earthquakes. The study will take place in California, and data from the February 9 earthquake will be used as background.

The results of the study will include estimates of total earthquake losses that could be experienced in the event of earthquakes in magnitudes of 8.3, 7.5, and 6.5 on the Richter Scale. Damage assessments will be estimated for various types of structures, public utilities, transportation, and communications systems. Major geologic hazards and probable casualties at each degree of severity also will be included.

## 9. PROGNOSIS: Finishing Up and Looking Ahead

The most urgent, "emergency," Federal actions in response to the needs of the earthquake disaster victims, in both the public and the private sectors, have been initiated and largely completed. But the months ahead will be devoted to more than looking back at what happened and what has been done about it. Much Federal assistance is still to come. For repair and restoration work, there will be monitoring, inspections, audits. For loan repayments, the paper work will continue for years. For new programs, refinements in requirements and procedures can be expected. For new problems, long-term solutions and interim ingenuity can be sought. And, of course, there are the bills to pay.

The Federal Government's contribution to the earthquake recovery--in loans and grants, but not including the cost of many man-years of work by Federal personnel in the regular line of duty--is estimated at roughly \$450 million. For disaster assistance, this is a mind-boggling figure, even in these days of billion-dollar budget items and trillion-dollar Gross National Product. Of that total, OEP expects to provide some \$135 million from the President's Disaster Fund. The rest will come from other agencies, principally HEW, HUD, Transportation, Small Business. So far, OEP has allocated \$11 million for this disaster, but with the assurance, backed by Congressional appropriations, that additional funds will be forthcoming when actually needed.

With first requirements under control, the formal procedures of State and local project application and OEP Regional Office approval are now gaining momentum.

Even more than all these project approvals and funding, even more than all the other Federal expenditures, the greatest impact of California's earthquake on Federal disaster assistance--and conversely, the greatest impact of the assistance program on future earthquakes and other disasters--may well come from the lessons learned in the first 100 days since February 9 and in the weeks and months of evaluation ahead.

The enormous cost of this disaster has stimulated scientists and engineers, as well as legislators and administrators, increasing the promise of better warning, and detection, construction and protection.

Findings from the California quake contributed greatly to the exchange of knowledge at the recent International Meeting on Earthquakes, so that other nations prone to earthly tremors can improve their awareness, their preparedness, their ability to react swiftly and sufficiently.

In this country, the quake analyses and the operational experience of those immediately involved can also serve to catalyze disaster planning at all levels of government. The best hope for reducing the cost of disasters lies in their prevention and, short of that, in reducing vulnerability to them. This requires research and plans, codes and standards, public awareness and support.

To these ends, and to the even greater responsiveness of the Federal Government in supplementing State and local action in disasters, the California earthquake of February 9, 1971 has made a salient contribution.

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