The original documents are located in Box C37, folder "Presidential Handwriting, 3/24/1976" of the Presidential Handwriting File at the Gerald R. Ford Presidential Library.

THE WHITE HOUSE

WASHINGTON

March 24, 1976

ADMINISTRATIVELY CONFIDENTIAL

MEMORANDUM FOR: PAUL O'NEILL

FROM: JIM CONNOR JEC

SUBJECT: Earthquake Research & Monitoring

Confirming phone call today to Jim Jura of your office, the President reviewed your memorandum of March 23 on the above subject and made the following notations:

"Talked with Senator Cranston 3/24/76.
Gave him information in memo. He questioned
$2.1 reprogramming out of FY 76 or 77?
I said you would call him.

Please let me know results of your conversation."

Please follow-up with appropriate action.

cc: Dick Cheney

THE WHITE HOUSE
WASHINGTON

Paul O'Neil 9/ Urgent

Talked with Len. Garment

3/24/76.

Gave him info in

memo.

He questioned in #2.1

reprogramming out of F.Y 76

or 77?

I said you would

call him.

Please let me know

results of your conversation

THE WHITE HOUSE
WASHINGTON

MARCH 23, 1976

MR. PRESIDENT:

SENATOR CRANSTON HAS CALLED TWICE TODAY. MAX FRIEDERSDORF HAS TALKED TO HIM, AS HAS PAUL O'NEILL, BUT THE SENATOR STILL WANTS TO TALK TO YOU.

CRANSTON IS ASKING FOR MORE MONEY TO STUDY THE EARTHQUAKE SITUATION IN CALIFORNIA. (See attached article from New York Times.)

ATTACHED ALSO IS A MEMO FROM PAUL O'NEILL AND A COPY OF THE VICE PRESIDENT'S FEBRUARY 19TH MEMO TO YOU.

TERRY

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

March 23, 1976

MEMORANDUM FOR THE PRESIDENT

FROM: PAUL H. O'NEILL

SUBJECT: Earthquake research and monitoring

Background:

- Recent news media articles about the uplift area along the San Andreas fault north of Los Angeles are based on reports by the Geological Survey issued earlier this year.

- Research is being conducted to try to determine when earthquakes will occur, their magnitude and the geographic area that will be affected.

- No operational earthquake warning system exists and research has not indicated the kind of system needed to have reliable predictions about earthquakes.

- Major earthquakes have occurred subsequent to the observation of bulges such as that observed in southern California. On the other hand, in other instances the bulges have disappeared over time and no earthquake has occurred.

- An operational warning system is at least 10 years away.

- Beyond the problem of prediction and warning there is a further problem of determining the kinds of actions to be taken in response to a prediction, e.g., evacuation and return.

Budgetary Issues

- As a result of the Geological Survey report, the Interior Department requested a budget amendment of $12 million

above the budgeted amount of $10.5 million. It also identified a second option of increasing the amount by $32 million.

- Over $9 million are included in the National Science Foundation's 1977 budget for earthquake research primarily for studies on engineering of structures to withstand earthquakes.

- After discussions between the Science Adviser, the Secretary of the Interior and the Office of Management and Budget, OMB recommended an additional $2.1 million for the Geological Survey for the instrumentation and monitoring of the uplift in the Los Angeles area. One-half of this amount was to come from funds budgeted for other activities within the Geological Survey and one-half to come from transfer from the National Science Foundation.

- Further, the NSF and the Department of the Interior are to prepare a longer range program for consideration this fall in connection with the 1978 budget.

- The Vice President discussed this matter with the President on February 18, 1976, before final decisions were made.

- The proposed reprogramming was discussed at the appropriations hearings for the Geological Survey.

- Both Interior and the National Science Foundation testified on the Cranston bill (S. 1174) that it was unnecessary in light of the steps taken by the Administration.

- Interior Department invited the entire California congressional delegation for a briefing on this subject on March 4. No members showed up and only a few staff members attended the briefing.

- We are proceeding with each of the items identified in the Vice President's memo of February 19. (pages 2 and 3)

Attachment
VP Ltr of 2/19/76

THE VICE PRESIDENT

WASHINGTON

February 19, 1976

MEMORANDUM FOR THE PRESIDENT

FROM: THE VICE PRESIDENT

SUBJECT: Earthquake Prediction Research

This memorandum is to report on plans for dealing with the matter of earthquake hazard reduction and prediction research which has been identified as a problem area by the recently established science and technology advisory groups (Baker-Ramo groups) and which has drawn considerable attention in California.

Background

1. There is a growing consensus in the scientific community that research conducted in the U.S., USSR, Japan and China has substantially improved the possibility of predicting earthquakes. Concern about the possibility of predicting earthquakes has drawn increased attention because of the detection and measurement of a strongly suspected earthquake precurser. The suspected precurser is an uplifting of the earth's surface by about one foot over the past fifteen years along the San Andreas fault north of Los Angeles. While a cause for concern, scientists are quick to point out that similar uplifts have occurred in the past without being followed by an earthquake.

2. Knowledge of the uplift has become quite widespread over the past few weeks. At the same time, it has become known that the 1977 Budget reflects a small cut (about $500,000) below 1976 levels in earthquake prediction research in the U.S. Geological Survey, in the Interior Department.

3. The Senate Commerce Committee has scheduled hearings for today, February 19, on a bill introduced by Senator Cranston (and 12 others) to authorize $25 million annually for each of the next ten years in funding for the U.S. Geological Survey for earthquake prediction research. The bill also would authorize $15 million in the first year and $25 million for each of the next nine years thereafter for the National Science Foundation to carry out research and to implement engineering changes in building design and construction as well as planning for community preparedness and rehabilitation in earthquake-prone areas.

4. Following the attention given the problem by the Baker-Ramo groups, the matter of earthquake hazard reduction and prediction research was reviewed by the Science Adviser, Interior Department, OMB, and the Domestic Council.

Actions now planned

Secretary Kleppe, Guy Stever, Jim Lynn and Jim Cannon believe that, within the limits of the approved 1976 and 1977 Budgets, the appropriate course of action is to proceed as follows:

To deal with the Southern California Uplift situation

- Restore a $500,000 cut in the 1977 Budget request for Geological Survey (Interior Department) for earthquake prediction work.

- Provide an additional $2.1 million to buy instruments and monitor the Southern California uplift.

- Make the funding adjustment by reprogramming without seeking a budget amendment. Specifically:

  - $1.3 million will be obtained by reprogramming 1977 funds within the Geological Survey.

- $1.3 million in NSF 1977 funds will be used to pay for part of the cost of buying and installing instrumentation to monitor the uplift, with the understanding that the Foundation should participate with Interior in decisions on the selection of the instrumentation in order to maximize its use for basic research by the scientific community.

- In addition to these adjustments, the NSF is already planning within its 1977 Budget to devote an additional $1 million (over $4 million in 1976) to support more research on aspects of earthquake prediction.

To deal with the longer range question of an appropriate Federal earthquake prediction program

- The Science Adviser would, if you so direct, support and manage a major study -- working in close cooperation with Geological Survey and OMB -- to define an overall plan including the necessary resources to implement it, the objectives that are to be achieved and the mileposts for achieving them, for earthquake monitoring and prediction and hazard reduction. This plan should be ready for your consideration in the 1978 Budget process.

Next Steps

These plans and adjustments will be briefly referred to in testimony before the Senate Commerce Committee today, but details still are being worked out among Interior, NSF and the Executive Office of the President. Once the details are settled the Appropriations Committees will be notified of the changes.

Regarding a Presidential Statement

Your advisers listed above recommended against any White House announcement concerning the 1977 funding adjustments or the plans for a detailed effort to

layout an earthquake hazard reduction plan. A White House announcement could draw greater attention to the development than appears warranted at this time and could cause even greater concern in California than has resulted from recent publicity.

Earth Bulge Along San Andreas Fault Sends Tre

By ROBERT LINDSEY
Special to The New York Times

LOS ANGELES, March 22—They call it "The Bulge" and "The Blister" and "The Palmdale Bubble." And the scientists who study such things wonder: Has the earth heaved itself upward because it is sending an advance warning of the great earthquake that has long been expected here?

In a mystery that is perplexing geologists and beginning to cause serious concern for disaster planning officials, a huge expanse of the earth's crust has risen as much as 10 inches, as if inflated by rising yeast, along a 100-mile stretch of the San Andreas Fault. The bulge begins about 30 miles northeast of downtown Los Angeles and covers at least 4,500 square miles.

Geologists here say there is no evidence yet to establish whether such a swelling is a prelude to an earthquake or merely a scientific curiosity.

However, a similar, much smaller bulge occurred along the San Andreas Fault before the last major earthquake here, the 1971 San Fernando Valley quake that killed 64 persons. And, another bulge preceded a 1964 earthquake that killed 24 at Niigata, Japan.

Southern California has long lived with warnings that a big earthquake looms sometime in the future. But the threat has been mostly theoretical. The bulge has given the state something concrete to think about.

Projects Spurred

It has spurred a series of scientific projects to learn the significance of the mysterious bulge, precipitated cautious warnings that it could be a forewarning of a disaster, and has accelerated emergency planning. But so far, it does not appear to have shaken Californians' traditional apathy toward what scientists say is the inevitable big earthquake.

"The thing that intrigues us is its episodic nature," said Robert Castle, the United States Geological Survey researcher who led a group that discovered the bulge last year. "If we had seen it grow over a century," he said, "we wouldn't be too concerned."

eastern portion slipping southeast, and the western side slipping northwest. This is causing subterreanean stresses that scientists expected to be released eventually in an earthquake. The concern now is that the earth's uplifting could be an indication of the accumulating stresses on the fault.

A Casual Apathy

Despite warnings of an inevitable major tremor, the lack of a specific projection, California's acceptance of life with many frequent small earthquakes, and a general philosophy that treat earthquakes as not much more worrisome than threats of hurricanes or driving on ice-slickened roads in other parts of the country, have created a casual apathy, of what will be, will be, about earthquakes.

But, in the belief that the bulge could be an advance signal of a major earthquake, state disaster-planning officials have expanded efforts to awaken concern about the problem.

Meanwhile, to learn more about significance of the earth swelling, seismic researchers for the United States Geological Survey and the California Institute of Technology have zeroed in on the 100-mile stretch of the fault with new monitoring devices and studies of other data. However, they say work is being slowed by insufficient budgets.

Recently a special hea ing on the bulge was convene here by the state Seismic Saf ty Commission. A Los Angel municipal building offici warned that about 14,000 u reenforced masonry buildin in the city did not meet t most up-to-date earthquak reenforcement standards a would be severely battered b a major earthquake. More tha 75,000 people, many of the poor, live in these structure according to the official, Robe Willaims.

He urged enactment of proposed city ordinance th would require unsafe buildin to be torn down, but he for cast strong opposition from t owners of such properties.

But, he continued, the land uplifted over a three-to-four-year period in the early and mid-1960's, "and that's very unusual. And of course we're concerned because it happened roughly in the same area on the San Andreas Fault as the last great earthquake in Southern California, in 1857."

The research team discovered the puzzling bulge by checking geodetic reports after an increased land elevation was found to have occurred before the San Fernando earthquake.

However, Mr. Castle and other scientists emphasize that the evidence on the issue is mixed. There have been many other earthquakes where no uplifting had occurred in advance, they said, and bulges have occurred about 70 years ago, and no major quakes followed.

The bulge area is a vast region of mountainous and desert terrain, most of it covered by sand and sagebrush, and inhabited only by jackrabbits, rattlesnakes, prairie dogs and coyotes. The greatest uplifting occurred near Palmdale, a dry, wind-battered town where the City of Los Angeles is buying almost 20,000 acres of land for a new jet port.

For years, earth scientists have said that the crust along the San Andreas Fault, a deep fracture that extends from north of San Francisco to south of the Mexican border, and associated faults, were becoming much like a spring wound tighter and tighter.

It is only a matter of time, they said, before the spring breaks, releasing a great deal of energy, much of it accumulated since the last "great" earthquake in 1857, and which is believed to have been equivalent to a measurement of eight on the Richter scale.

The land masses on each side of the fault are being pulled in opposite directions by movements of large areas of the earth's layers, with the

mors of Consternation Through Quake Specialists

Last Wednesday, Dr. Vincent E. McKelvey, director of the Geological Survey, flew to Sacramento to brief senior state officials about the bulge.

State Officials Briefed

According to officials who were present, he stressed that it might or might not be a precursor of an earthquake, emphasizing that too little was known about the phenomenon. But he advised them to give consideration to the possibility that it could forewarn of a major disaster.

"We're regarding this as a good deal more significant than a scientific curiosity," said H. Roger Pulley, an earthquake specialist in the state's Office of Emergency Services.

The state, he said, regards the bulge as "something of a threat, but accompanied by a great deal of scientific uncertainty; we don't know what it means."

Nevertheless, he said, his department would use discovery of the phenomenon as an opportunity to accelerate efforts to get local governments to upgrade planning for a serious disaster and to upgrade building codes where necessary, and to urge the public to give thought to the possibility of a major earthquake.

"We're going to use the Palmdale Bubble as a way to get the people's attention," he said. "We've talked about the problem; now you've got something, a two-by-four, to hit them between the eyes—that you'd better pay attention and listen."

Despite the recent new uneasiness, no one had predicted that a major earthquake is imminent. The researchers apparently are hoping that nature will not release the enormous energy accumulated deep in the earth until they have learned how to predict, with some accuracy, when, where and with what intensity an earthquake will occur.

For the most part, researchers studying the fault said they have not discovered any clues other than the bulge itself, suggesting that an earthquake is near on the fault, although Dr. James W. Whitcomb of Cal Tech said that over the last year he had measured changes in the pattern of sound waves sent through the fault near where the bulge occurred.

Such changes in seismic wave velocities have often been cited as possible precursors of an earthquake. However, Dr. Whitcomb and other scientists stress that much more needs, to be measured and learned about the behavior of the fault and its mysterious swelling.

For now, he said, it is impossible to say that the uplift is telegraphing an impending earthquake, but he added, "We can't afford not to study this possibility."

THE VICE PRESIDENT
WASHINGTON

February 5, 1976

MEMORANDUM FOR: THE PRESIDENT

FROM: THE VICE PRESIDENT

SUBJECT: Indications of Possible Major Earthquake in California

1. At one of the Science-Advisory Panel meetings two weeks ago, Dr. Frank Press, Chairman of the Department of Earth and Planetary Sciences at M.I.T., reported on indications of a possible major earthquake in California. Through Dr. Teller, I asked him to give me the basic information, which is in the attached letter.

2. As Dr. Press' letter states, this information will soon become public, probably in Science magazine, later this month.

3. I have sent copies of the letter to Dr. Teller, Dr. Hans Mark, and Dr. Guy Stever of the National Science Foundation, as well as to the chairmen of the two science-and-technology advisory and consulting groups (Simon Ramo and Bill Baker).

4. What is at stake is:

-- restoration of 25% funding cut for the U.S. Geological Survey's National Earthquake Information Service;

-- appropriation of $2 million for a "dense" earthquake-monitoring network at the Southern end of the San Andreas fault, similar to the network already operating effectively at the Northern end of the fault, near San Francisco;

-- consideration of additional funds ($10 - $20 million) to "put us at the same level as the Chinese" in our national earthquake-predicting capability.

5. I am arranging a meeting today of Domestic Council staff people and representatives of the Interior Department (U.S. Geological Survey), H.U.D. (disaster assistance), the National Science Foundation and OMB.

6. This group will review the attached letter and report to me on what should be recommended. I'll have these recommendations ready for you at our meeting next week.

DEPARTMENT OF EARTH AND PLANETARY SCIENCES

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
CAMBRIDGE, MASSACHUSETTS 02139

21 January 1976

The Honorable Nelson A. Rockefeller
Vice President
Room 275
Old Executive Office Building
Washington, D. C. 20500

Dear Mr. Vice President:

Edward Teller, my fellow member on the Advisory Group in Science and Technology, tells me that he mentioned to you our deep concern over a recent discovery of the U. S. Geological Survey that much of the Mojave Desert of southern California and the mountains to the southeast of it have risen as much as one foot in the past fifteen years. The uplift is centered along the northern edge of the San Andreas fault, the fault that gave rise to the 1906 earthquake in San Francisco. The discovery, which will soon be released publicly, is most disturbing because such uplifts in the past have preceded earthquakes of great destructive power. This particular section of the San Andreas fault lies about 40 miles north of Los Angeles. In the view of most knowledgeable scientists, it is a dangerous section having last broken in a great earthquake in 1857.

The effect on Los Angeles of an earthquake in the region of the uplift would be quite disastrous. A structural engineer at U.C.L.A., Professor Martin Duke, has estimated that as many as 40,000 buildings would suffer collapse or serious damage.

There is no question that the uplift must be taken very seriously even though geophysicists have, as yet, no clear understanding of its origin or significance. An uplift preceded the earthquake that struck San Fernando, California in 1971, and uplifts have preceded earthquakes in Japan and China. An uplift in Southern California around 1900, however, was not followed by an earthquake.

The region of the uplift should now be subjected to a most intense scrutiny and the future developments monitored closely. If even an approximate warning of the approach of

a great earthquake can be given, thousands of lives could be saved and the possibilities of conflagration and flooding substantially reduced.

In Japan, a geophysical anomaly of this magnitude would trigger an intensive study or a public alert.

Unfortunately, there are insufficient funds in the national research program on earthquake prediction to monitor the region of uplift and provide the scientific attention which this anomaly deserves. To carry out the program of monitoring and research on the origin of the uplift, an initial outlay of about two million dollars would be required. Beyond the first year, an annual budget of one million dollars would be needed for resurveying, equipment maintenance and data analysis. The essence of the problem is that gradual changes in the ground deformation, earthquake activity, magnetic field and other phenomena have been shown to precede large earthquakes. In order to predict the time of occurrence, however, these effects must be measured continuously.

The total earthquake prediction program in the United States amounts to about five million dollars a year. In view of the large number of casualties and the potential damage of a great earthquake, many of us believe that this program can justifiably be increased.

You may recall that when you attended a meeting of the National Science Board last year, I told you about the great accomplishment of Chinese scientists in predicting a great earthquake in northeast China a few hours before its occurrence. The Chinese evacuated tens of thousands of people and claim to have saved thousands of lives. Having visited China, I can attest to their technical proficiency in this field of science, and express my own concern that because of insufficient resources a similar achievement may not be possible in this country.

Yours sincerely,

Frank Press

Frank Press
Chairman

FP/ac

THE VICE PRESIDENT
WASHINGTON

January 28, 1976

Dear Dr. Press:

Many thanks for your letter of January 21. I was fascinated by your discussion of our developing earthquake-prediction capability at that part of the advisory-group meeting I attended two weeks ago. Now your letter puts what we can feasibly do into realistic perspective and makes our need to perfect an actual earthquake-prediction capability all the more urgent.

You are raising what is literally a vital matter of concern for the Nation. This is precisely the kind of matter the President had in mind when he created these advisory-and-consulting groups. He and I appreciate all that you have been doing.

I'm deeply grateful to you for following up your conversation with Edward with this detailed and chilling analysis for me.

With best wishes,

Sincerely,

Dr. Frank Press
Department of Earth and Planetary Sciences
Massachusetts Institute of Technology
Cambridge, Massachusetts 02139

P.S. I would appreciate having your views on the appropriate procedure from this point.