11. The damaging effects of the 1990 Loma Prieta earthquake were substantiated by a special report published by the CDMG in 1990,[9/] which stated in part:

> The Loma Prieta earthquake of 17 October 1989 did more to make people in California aware of earthquake hazards than any other single event of the last 18 years. The event killed 63 people, injured 3,757, left over 12,000 homeless, and caused over $5.9 billion in damage... Damage occurred over a wide area (Figure 1) and included effects of strong shaking and various forms of ground failure including liquefaction . . . .[10/]

12. Loma Prieta Peak is located within a few kilometers of the epicenter of the 1989 Loma Prieta Quake that registered 7.1 on the Richter scale and caused particularly severe local ground shaking within an area of approximately 20 kilometers from the epicenter. As will be explained in more detail below, as a mountain peak, Loma Prieta has summit ridges that are especially vulnerable to severe shaking in any earthquake. According to the 1990 CDMG Report:

> The Loma Prieta earthquake epicenter is located in the Laurel quadrangle, U.S. Geological Survey 7.5-minute Series (Topographic) and immediately adjacent to the Loam Prieta quadrangle of the same series. The epicenter was located in the Forest of Nisene Marks State Park. The event occurred in the southern Santa Cruz Mountains, a physiographic feature which appears

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9/ "The Loma Prieta (Santa Cruz Mountains), California, Earthquake of 17 October 1989," edited by Stephen R. McNutt and Robert H. Sydnor, Special Publication 104, 1990 ("1990 CDMG Report").

10/ Id. at v. Figure 1 (at page vi of the 1990 CDMG Report), includes Loma Prieta Peak within the shared area depicting "Area of aftershocks and abundant landslides. A reproduction of Figure 1 is attached hereto as "Attachment B."

> in most world atlases; Loma Prieta is the highest peak in these mountains and is located just a few kilometers from the epicenter.[11/]

13. The 1990 CDMG Report indicated that Loma Prieta Peak, where KNTV's tower is sited, was within the zone that experienced the strongest shaking from the Loma Prieta earthquake:

> For the Loma Prieta earthquake, a zone within about 20 km of the fault experienced the strongest shaking. This region, where the peak acceleration was generally 40% g or greater, is indicated in Figure 11.[12/]

14. Loma Prieta Peak probably experienced particularly strong shaking from the Loma Prieta earthquake in 1989 because it was a high peak in the area. In this connection, I interviewed Mr. Earl W. Hart, a geologist for the State of California, who discussed the phenomenon of "topographic amplification" that is created by the significant focusing of ground motion as shockwaves from an earthquake travel upward through the tapering

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11/ Id. at vii; see also Map attached as "Exhibit E-1" attached to the Engineering Statement of Richard E. Biby, showing the location of epicenter of the Loma Prieta Quake relative to the location of Loma Prieta Peak.

12/ 1990 CDMG Report at 41. From, "Strong Ground Shaking From the Loma Prieta Earthquake of 17 October 1989, and Its Relocation To Near Surface Geology In The Oakland Area, modified from: A Preliminary Report To: Governor's Board of Inquiry on the 1989 Loma Prieta Earthquake," by Anthony F. Shakal, Mark J. DeLisle, Michael S. Reichle, and Robert B. Darragh. Figure 11 cited above (at page 43 of the 1990 CDMG Report) includes the Loma Prieta Peak location within an area identified in the caption as the "Strongly shaken zone (stippled area) for the 17 October 1989, Loma Prieta earthquake (peak acceleration generally 0.4 g or greater)." A reproduction of Figure 11 is attached hereto as "Attachment C."

mass of rock and soil, causing peaks and ridges to shake severely from side-to-side. Although Mr. Hart did not visit Loma Prieta Peak following the October, 1989 earthquake, he did conduct extensive site analyses of other ridge areas near the epicenter, observing severe ridge-top fissuring he and others believe resulted from severe ground shaking rather than from tectonic movement. He and others have written reports describing their observations and analyses of features resulting from the "topographic amplification" phenomenon.[13/] These reports indicate that peaks and ridges like Loma Prieta Peak are likely to suffer particularly severe ground shaking during seismic activity.

15. The following excerpts from these reports illustrate the devastating effect of this phenomenon on peaks near and like Loma Prieta Peak:

> The strongest shaking recorded in the near field at a ground-response site (a site not located in or near a building or bridge) was 0.64 g horizontal. It was noted by field observers that damage near this particular site (Corralitos) was relatively minor, where damage nearby, particularly on ridges, was extensive. This may suggest that shaking on the ridges and throughout much of the epicentral area was stronger than 0.64 g (Spittler and Sydnor, 1990).[14/]

13/ See 1990 CDMG Report at 83-93, for a discussion of Mr. Hart's views (set forth in "The Search for Fault Rupture, And Significance of Ridgetop Fissures. Santa Cruz Mountains, California," by Earl W. Hart, William A. Bryant, Christopher J. Wills, and Jerome A. Theisman).

14/ 1990 CDMG Report at 21. From "Seismological Aspects of the 17 October 1989 Earthquake," Stephen R. McNutt and Tousson R. Toppozada, California Division of Mines and Geology.

16. The report goes on to state:

> Fractures are most common on long, narrow, steep-sided ridges... [A]ccelerations may have been greater than 1.0 g in some areas as indicated by stones, logs, and concrete slabs that have been apparently thrown from their original position with little or no rolling. Topographic amplification of the strong ground shaking is a possible cause for the dominance of fractures along ridgetops. Topographic amplification is also suggested by observations of broken tops of tall trees more commonly along ridgetops than in other areas and the appearance of a greater amount of damage to structures of similar construction on ridgetops relative to side slopes and valley bottoms (Spittler and Sydnor, 1990).[15/]

17. In summary, the technical literature indicates that peaks and high ridges are particularly sensitive to topographic amplification of ground shaking during seismic events. Experts have reported that earthquake-generated side-to side ground shaking on ridgetops caused tall trees to break. The damage caused by the Loma Prieta Quake to the upper portion of KNTV's tall TV transmission tower and antenna, which was bent at the top in a fashion similar to the breaking of the tops of tall trees in the 1989 quake, may have also been attributable to the strong side-to-side ground shaking on ridgetops.[16/] For functional reasons, however, TV transmission facilities, including tall towers, must be located on peaks or high ridges.

15/ 1990 CDMG Report at 64. From "Landslide Features and Other Coseismic Fissures Triggered by the Loma Prieta Earthquake, Central Santa Cruz Mountains, California", Spittler, Harp., Keefer, Wilson, and Sydnor, California Division of Mines and Geology.

16/ See Photograph of the damaged KNTV tower set forth as Exhibit 1 to the Petition for Rulemaking.

It is essential, therefore, that TV transmission towers be sited on peaks and ridges located at greater distances from known active faults because such locations are less likely to be subject to the probability of severe seismic ground shaking.

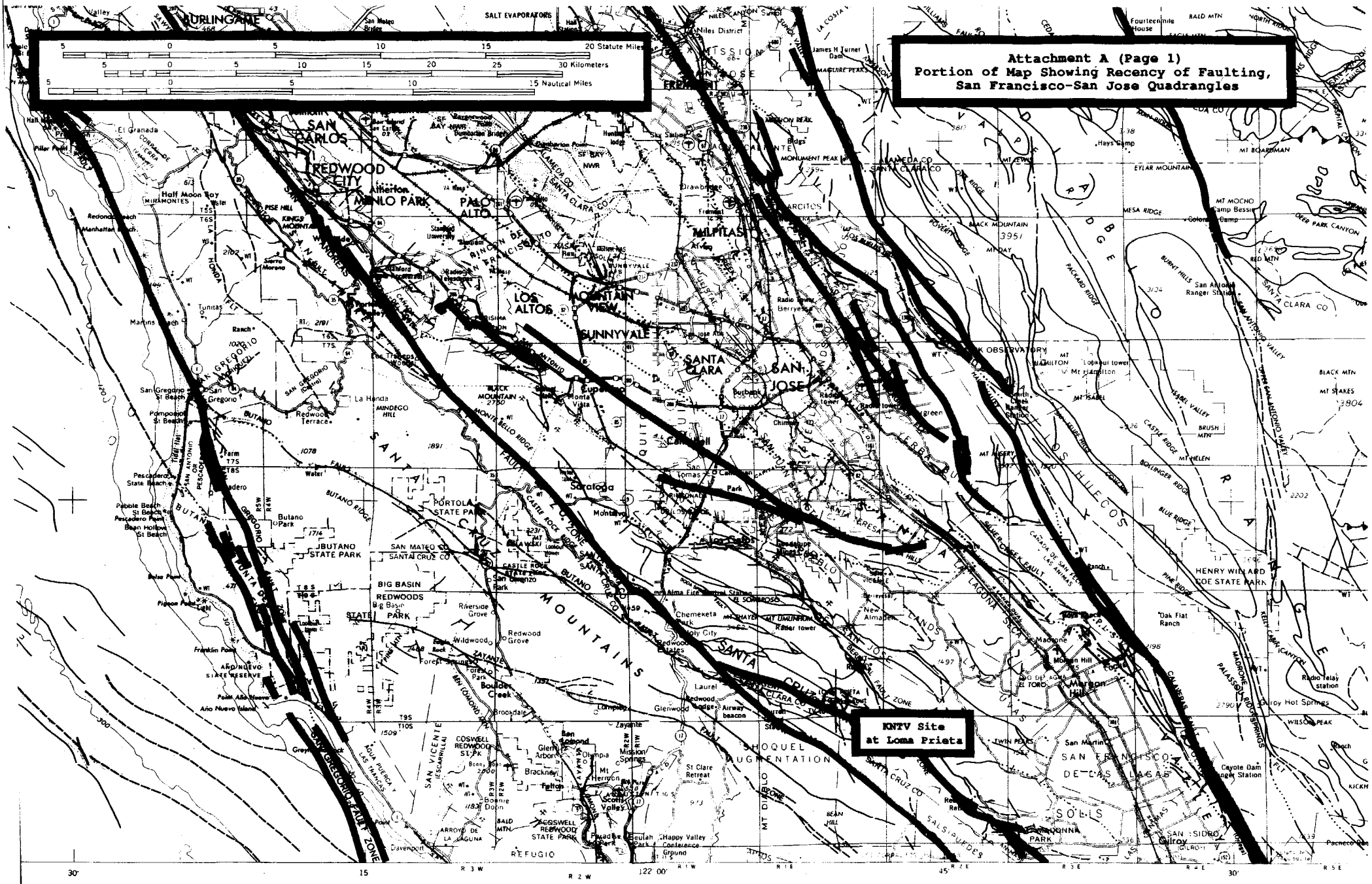
18. Based upon my professional experience (as described in paragraphs 1, 2 and 3 above) and upon my review of the technical literature and mapping researched and cited above, Loma Prieta Peak, by its location directly on the Sargent fault, its immediate proximity to the San Andreas fault, and its proximity to the epicenter of the October 17, 1989 quake, almost certainly is as poor a location for a TV transmission facility, in terms of seismic risk, as exists in the greater San Francisco Bay Area. Other locations appear to be available in the greater San Francisco Bay Area that offer sufficient elevation for transmission requirements that are less likely, based upon proximity to active faults believed by experts to be capable of generating major seismic events, to experience ground shaking as severe as has occurred and is likely to occur again at Loma Prieta Peak.

I declare that the foregoing is true and correct to the best of my knowledge and belief.

Richard E. Hammond

RICHARD E. HAMMOND

Dated: February 17, 1993

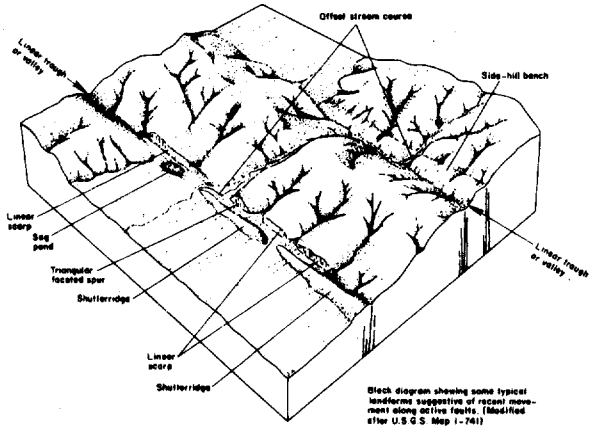

Attachment A (Page 1)
Portion of Map Showing Recency of Faulting,
San Francisco-San Jose Quadrangles
KNTV Site
at Loma Prieta
5 0 5 10 15 20 Statute Miles
5 0 5 10 15 20 25 30 Kilometers
5 0 5 10 15 Nautical Miles
BURLINGAME
SAN CARLOS
REDWOOD CITY
MENLO PARK
PALO ALTO
MILPITAS
LOS ALTOS
MOUNTAIN VIEW
SUNNYVALE
SANTA CLARA
SAN JOSE
SALT EVAPORATORS
SAN GREGORIO FAULT ZONE
SANTA CRUZ MOUNTAINS
SANTA CLARA VALLEY
DIABLO RANGE
HENRY WINLAND COE STATE PARK
BIG BASIN REDWOODS STATE PARK
PORTOLA STATE PARK
BUTANO STATE PARK
ANO NUEVO STATE RESERVE
COSWELL REDWOOD STATE PARK
SHOQUEL AUGMENTATION
SAN FRANCISCO DE LAS LAGAS
SOLIS
SAN SIDRO
Gilroy
Morgan Hill
Madrone
Saratoga
Los Gatos
Boulder Creek
Felton
Ben Lomond
Scotts Valley
Mt Hermon
Mission Springs
Aptos
Capitola
Santa Cruz
Watsonville
Davenport
Half Moon Bay
Pescadero
Pigeon Point
Franklin Point
Point Ano Nuevo
Ano Nuevo Island
Pebble Beach
Pescadero Point
Bean Hollow St Beach
Pomponio St Beach
San Gregorio
Tunitas
Martins Beach
Redwood Terrace
La Honda
Butano Park
Pillar Point
Redondo Beach
Manhattan Beach
El Granada
Sierra Morena
Stanford University
Stanford Linear Accelerator
Alameda Co
Santa Clara Co
San Mateo Co
Santa Cruz Co
Monterey Co
Hayes Camp
Mt Boardman
Eylar Mountain
Mesa Ridge
Black Mountain
Mt Day
Mt Chopo
Camp Bessie
Deer Park Canyon
Burnt Hills
San Antonio Ranger Station
Red Mtn
Black Mtn
Mt Stakes
Mt Isabel
Isabel Valley
Castle Ridge
Mt Helen
Bollinger Ridge
Blue Ridge
Pine Ridge
Oak Flat Ranch
Radio Telay station
Gilroy Hot Springs
Wilson Peak
Coyote Dam Ranger Station
Pacheco Pass
Mt Sizer
Mt Hamilton
Lick Observatory
Mt Hamilton Ranger Station
Mt Misery
Silver Creek Fault
Laguna Seca
Chamberlain Fault
Palassou Ridge
Madrone Springs
Kelly Canyon
Kickh
Radio Tower
Radar tower
Chimney
Lookout tower
Water
Farm
Ranch
Airway beacon
Radio Tower
Radio Telay station
Radio Tower
Radio Tower
Radio Tower

Attachment A (Page 2)
Legend and Footnotes for Map Showing Recency of Faulting, San Francisco-San Jose Quadrangles

Geologic Time Scale			Years Before Present (Approx.)	Fault Symbol	Recency of Movement on Land	Recency of Movement Offshore[1]	DESCRIPTION
Quaternary	Late Quaternary	Historic					Displacement during historic time (e.g. San Andreas fault 1906). Includes areas of known fault creep.
		Holocene	200				Displacement during Holocene time.[2]
		Pleistocene	10,000				Faults showing evidence of displacement during late Quaternary time.[3,4]
	Early Quaternary		700,000				Quaternary (undifferentiated) faults — most faults in this category show evidence of displacement during the last 2,000,000 years; possible exceptions are faults which displace rocks of undifferentiated Plio-Pleistocene age.
Pre-Quaternary	Pliocene		2,000,000				
	Miocene		5,000,000				Fault showing evidence of no displacement during Quaternary time or faults without recognized Quaternary displacement.

FOOTNOTES

[1] Offshore faults classified according to McCulloch and Greene (1989).
[2] Geomorphic evidence for Holocene faulting includes: sag ponds, or the following features in Holocene deposits: offset stream courses, linear scarps, shutterridges, and triangular faceted spurs.
[3] Geomorphic evidence for late Quaternary faulting includes such features as offset stream courses, linear scarps, shutterridges, and triangular faceted spurs.
[4] Faulting may be younger but lack of younger overlying deposits precludes more accurate age classification.



Block diagram showing some typical landforms suggestive of recent movement along active faults. (Modified after U.S.G.S. Map I-741)

RECENCY OF FAULTING

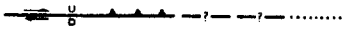
This map depicts recency of activity along faults on the San Francisco-San Jose Quadrangle. Data for this map were compiled from a large body of literature, published and unpublished, regarding faulting in the central part of the Coast Ranges, San Joaquin-Sacramento Valley, and the Sierra Nevada. Faults shown are identical to those on the accompanying Geologic Map of the San Francisco-San Jose Quadrangle. The purpose of this compilation is to depict what is currently known about the recency of displacement along these faults. Future studies in this region may discover additional faults, require relocation of faults as they are presently mapped, or change the age designations as shown here.

Age designations are assigned by examining geologic evidence along faults to determine the youngest faulted unit, the oldest unfaulted unit, or the relative age of geomorphic features that were produced from fault rupture. Faults are classified as historic (rupture within the past 200 years), Holocene (rupture within the last 200-11,000 years), Late Quaternary (rupture within the last 700,000 years), and undifferentiated Quaternary (rupture during the last 2,000,000 years or faults that displace rocks of undivided Plio-Pleistocene age). Faults with evidence for no displacement in Quaternary time are classified as pre-Quaternary. Faults with insufficient evidence for classification and faults which may not have been fully evaluated for recency of displacement, are grouped with the pre-Quaternary faults.

The reliability of the fault age designations on this map are dependent upon several factors. First, data used to classify faults particularly west of and including the Calaveras fault zone, are based on studies directed toward determining the recency of fault displacement. East of the Calaveras fault zone, most of the data used to classify faults were based on studies not directed toward determining the recency of movement along faults. Second, important fault-related geomorphic features may have been destroyed by natural or human activities. Third, geologists may differ in their interpretations of the geologic evidence for recency of faulting. Fourth, the ages of rock and alluvial units used to classify the faults may not be accurately known, and fifth, varying climatic conditions may affect the preservation of fault-related geomorphic features.

This is a small scale (1:250,000) regional map, and should be used only as a first approximation of potential seismic hazards in an area. A detailed geologic investigation should be the core of any site-specific study for planning or development purposes.

FAULT MAP SYMBOLS



Faults On Land

Solid where well located; dashed where approximately located or inferred; dotted where concealed by younger rocks, lakes, or bays; queried where continuation or existence is uncertain. Barbs indicate thrust fault (barbs on upper plate). Arrows indicate relative or apparent direction of movement. U, upthrown side and D, downthrown side (relative or apparent).

Faults Offshore

Solid where well-defined, dashed where approximately located or inferred. Thrust barbs shown on upper plate. U, upthrown and D, downthrown side (relative or apparent).

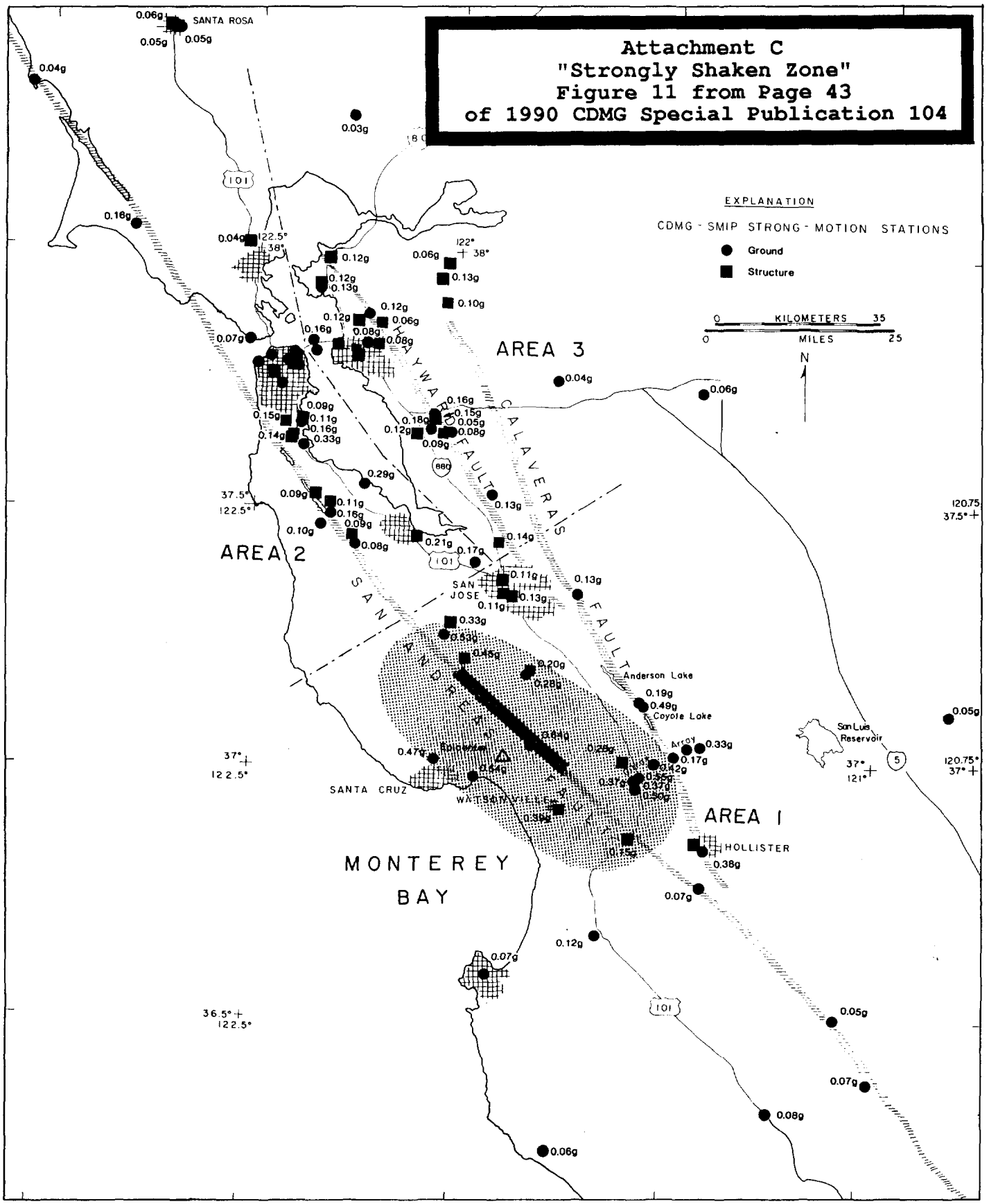


Figure 11. Strongly shaken zone (stippled area) for the 17 October 1989, Loma Prieta earthquake (peak acceleration generally 0.4 g or greater).

ORIGINAL

Exhibit E

Engineering Statement in Re:

Use of VHF-TV Ch. 11 at Willits, California

Petition to Amend §73.606(b) Table of Allotments, TV

Prepared on Behalf of Granite Broadcasting Corporation

KNTV Ch. 11 San Jose, California

Introduction

This engineering statement has been prepared in connection with a Petition for Rulemaking filed by Granite Broadcasting Corporation ("Granite") and KNTV, Inc. requesting that the Commission delete the vacant Ch. 11 allotment at Willits, California or, alternatively, that the Commission substitute one of several UHF-TV channels identified herein at Willits for VHF-TV Ch. 11, in order to allow Granite and its subsidiary, KNTV, Inc. to relocate the transmitter site for KNTV Ch. 11 at San Jose.

Granite seeks to move KNTV farther away from the epicenter of the "Loma Prieta Earthquake" of October, 1989, one of the most devastating earthquakes in California history. The epicenter of the earthquake is approximately 9 kilometers south southwest of the KNTV transmitter site on Loma Prieta Peak, 17.6 km below the surface. The KNTV transmitting antenna suffered major structural damage in the earthquake. In order to continue to serve its principal community of San Jose and ensure continuity of service during local disasters, KNTV is obliged to relocate.

Due to a combination of technical and physical (i.e., geographic and topographic) factors, virtually any relocation of the KNTV transmitter site will involve at least some northwards movement. Any movement southwards, away from San Jose, will result in the degradation of signal quality and terrain shielding into the city of San Jose because of the nature of the topography of the Santa Cruz Mountains. To the north, the Commission's minimum distance separation requirements for co-channel facilities butt

Ch. 11 at Willits, CA against the KNTV transmitter site. With Ch. 11 in place at Willits, the KNTV transmitter site can not be moved northwards to a viable site from which KNTV might maintain its level of service to San Jose. Granite therefore seeks to remove the obstacle of the Channel 11 allotment at Willits.

Loma Prieta Earthquake and the Proximity of KNTV to the Epicenter

KNTV suffered significant structural damage to its transmitter facilities during the Loma Prieta earthquake of October 1987 ("the earthquake"). The materials cited in the declaration of Richard E. Hammond, Esq. include detailed geologically and seismologically oriented reports on the earthquake such as Special Publication 104: The Loma Prieta (Santa Cruz Mountains) California Earthquake of 17 October 1989, McNutt and Sydnor, ed. California Department of Conservation, Division of Mines and Geology (1990). Therein, at page 12, the epicenter of the earthquake is described as an area at North Latitude 37° 02.33' ±1 km West Longitude 121° 52.76' ±1 km. Attached as Exhibit E-1 are copies of the pertinent portions of the U.S.G.S. 7.5' topographic quadrangles "Laurel, CA" and "Loma Prieta, CA" illustrating the location of the epicenter and the relative proximity of the KNTV transmitter site on Loma Prieta Peak.

Allocation Constraints Affecting KNTV

In accordance with Sections 73.610 and 73.698 of the FCC Rules, KNTV must observe minimum distance separation requirements towards a few Television Broadcast stations. These separation requirements are tabulated in Exhibit E-2 and illustrated in Exhibit E-3 on a standard U.S.G.S. 1:250,000 base map.

The separation requirements, when transferred to maps depicting the seismic fault areas and epicenters of recent earthquakes, offer illustratively the conclusion that there are more seismically stable areas to which KNTV might be relocated if the separation requirement towards Ch. 11 at Willits were removed. Exhibit E-4 is a photocopy of a LandSat image prepared by the U.S.G.S. to mark recent San Francisco Bay Area Earthquakes (1972 -

1989). On Exhibit E-4, the minimum distance separation requirements towards pertinent TV facilities are included. These constraints are also transferred to a copy of Attachment A of Richard Hammond, Esq.'s Declaration, labeled here as Exhibit E-5. It is clear from these maps that there is potential for improvement on the location of the KNTV tower relative to seismically stable areas, if the Willits, CA Ch. 11 allotment constraint is removed.

Alternative Channels Available for Willits, CA

In the event that the Commission is reluctant to delete the allotment to Willits, CA, there are numerous alternative UHF-TV channels available to substitute for Ch. 11 at Willits. Attached as Exhibit E-6 are tables illustrating the fact that the following UHF-TV channels might be substituted for Ch. 11 at Willits, at the coordinates set forth in the Index to the National Atlas of the United States with no site restriction (North 39° 24' 36" West 123° 21' 12"). Use of this set of coordinates will remove the 18.7 km site restriction created by the use of Ch. 11. The twenty potential alternative channels are: 15, 21, 25, 27, 33, 39, 41, 43, 45, 47, 51, 53, 55, 56, 57, 59, 61, 63, 67, or 69.

The Commission has not announced the specific UHF-TV channels and spacing requirements associated with the spectrum usage for Advanced Television. However, Willits is sufficiently far removed from most metropolitan areas except San Francisco that it is reasonable to expect that at least one of the twenty alternative channels identified here would survive the ATV frequency assignments.

The use of a UHF-TV allotment in place of a VHF-TV allotment would not deprive Willits of any quality or level of potential service. In regions where the terrain is gentle, close to the 50 meter roughness factor incorporated into Section 73.699 for propagation prediction purposes, a VHF-TV facility would probably have a coverage area somewhat greater than a UHF-TV facility of similar magnitude. In northwestern California, the terrain is precipitous and dramatically different from gentle, rolling

pastures with a 50 meter roughness factor. Narrow valleys nestle communities such as Willits along rivers and transportation thoroughfares built in an earlier day. Coverage from a UHF-TV facility at Willits would be very similar to coverage from a VHF-TV facility because of this terrain. In an area such as Willits, surrounded on all sides by mountain tops at least 2,000 feet higher than the community, and nearby peaks reaching 4,600' and 6,800' AMSL, a UHF television channel will provide service comparable to a VHF television channel.

Summary

The transmitter site for KNTV Ch. 11 at San Jose must be relocated northwards to a more seismically stable point. The Channel 11 allotment to Willits is the keystone obstruction to KNTV's relocation. In order for Granite to relocate its transmitter site, the Channel 11 allotment to Willits must be deleted, or, alternatively, one of numerous available UHF-TV channels must be substituted for Ch. 11 at Willits. Such a substitution will still provide service comparable or equivalent to a VHF-TV channel. The removal of Ch. 11 at Willits, either by deletion or substitution, will enable KNTV to relocate to a more seismically stable site and ensure to a far greater degree that it will be able to provide an uninterrupted service to San Jose.

Certification

All technical data submitted herein on behalf of Granite Broadcasting Company and KNTV, Inc. regarding the deletion of the Channel 11 TV allotment to Willits, California have been determined in accordance with the existing Rules and Regulations of the Federal Communications Commission. Under penalty of perjury, I state that the foregoing is true and correct to the best of my knowledge and belief.

Richard L. Biby

Richard L. Biby
Registered Professional Engineer
District of Columbia Reg. No. 5710E
Commonwealth of Virginia Reg. No. 014018

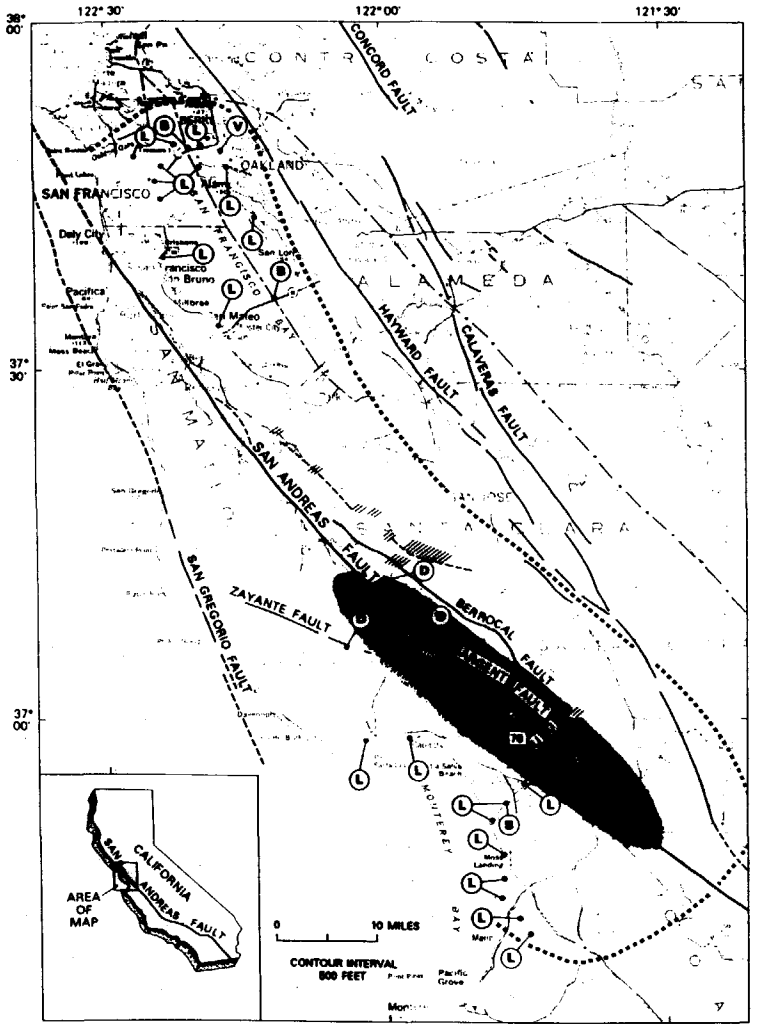


Figure 1. Mainshock epicenter of Loma Prieta earthquake and inferred fault rupture relative to areas of larger aftershocks, abundant ground cracks, and landslides and to limits of structural damage. Also shown are locations of major damaged structures and principal areas of ground cracks and liquefaction (source: Plafker and Galloway, 1989).

EXPLANATION

- D / U, 10 — Fault rupture of Loma Prieta earthquake--Arrows show relative horizontal movement; small arrow and numeral show direction and amount of dip; U, upthrown side; D, downthrown side
- Fault--Dashed where approximately located
- Main shock epicenter
- Area of aftershocks and abundant landslides
- Area of ground cracks possibly related to faulting
- Approximate limit of major structural damage
- Approximate limit of landslides
- (L) Prominent area of liquefaction
- (B) Damaged bridge
- (D) Damaged dam
- (V) Damaged two-story viaduct

Figure 1. Continued

This Special Publication is divided into three sections. The first focuses on the earthquake itself and its geologic and seismologic setting. The second section focuses on selected effects of the earthquake and study by several DMG programs. Key contributions are those on strong ground motion, landslides, and fault evaluation. The third section focuses on response and evaluation.

Special effort has gone into providing many high quality figures and complete tables throughout the publication. This was done to make the volume useful as a reference work on the Loma Prieta earthquake and on related geologic phenomena. For example, much of the information contained in the volume will be useful as background information when the next M≥ 7 earthquake strikes California.

The choice of topics was made to highlight DMG activities and to provide balance. However, it was not possible to cover every aspect of the earthquake. For example, liquefaction and several engineering aspects of the event have received only limited attention here. These have received adequate attention elsewhere (e.g., Plafker and Galloway, 1989).

GENERAL INFORMATION

The Loma Prieta earthquake epicenter is located in the Laurel quadrangle, U.S. Geological Survey 7.5-Minute Series (Topographic), and immediately adjacent to the Loma Prieta quadrangle of the same series. The epicenter was located in the Forest of Nisene Marks State Park. The event occurred in the southern Santa Cruz Mountains, a physiographic feature which appears in most world atlases; Loma Prieta is the highest peak in these mountains and is located just a few kilometers from the epicenter.

Under contract from the California Coastal Commission, the Division of Mines and Geology and the U. S. Geological Survey have cooperatively prepared a comprehensive set of seven regional geologic maps which cover the entire California continental margin at a scale of 1:250,000. Map area 5, covering the Santa Cruz and Monterey Bay area, is scheduled to be published in mid-1990; see Cockerham and others (1990) and McCulloch and Greene (1990).

The new 1:750,000-scale State Fault Activity Map (Jennings, 1991, in preparation) will delineate active faults in California using a five color classification scheme for recency of faulting.

Metric units have been used throughout most of this volume, reflecting standard scientific practice worldwide. An exception is found in the article by Real and others; both photography and aviation use English units as standards. (One kilometer is equal to 0.62 miles, or conversely one mile equals 1.61 kilometers. One meter is equal to 39.4 inches, or one foot equals 0.30 meters).

The earthquake occurred on October 17, 1989 at 5:04 p.m. Pacific Daylight Time (PDT, local time). This has created some confusion because it occurred on October 18, 1989 at 00:04 Greenwich Mean Time (GMT; also called Universal Time Coordinated or UTC). Further, a local time change occurred on October 29, 1989. Up until October 29, GMT was equal to local time (PDT) plus 7 hours; after October 29, GMT was equal to local time (PST) plus 8 hours.

Additional copies of this publication and other maps and publications of DMG may be obtained by writing to the Publications and Information Office, Division of Mines and Geology, 660 Bercut Drive, Sacramento, CA 95814-0131.

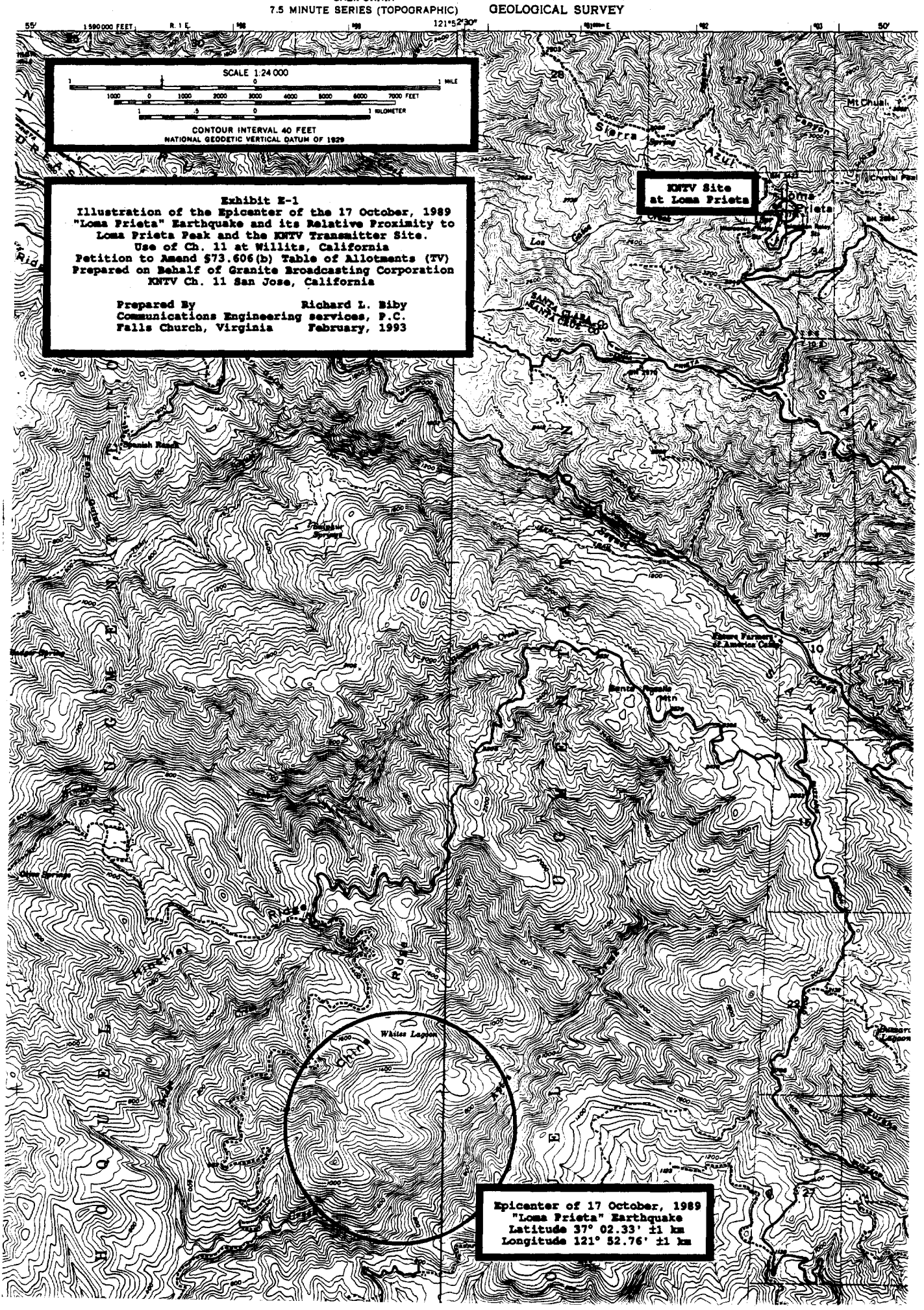

LAUREL QUADRANGLE
CALIFORNIA
7.5 MINUTE SERIES (TOPOGRAPHIC)
UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
SCALE 1:24 000
1 MILE
7000 FEET
1 KILOMETER
CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929
Exhibit E-1
Illustration of the Epicenter of the 17 October, 1989
"Loma Prieta" Earthquake and its Relative Proximity to
Loma Prieta Peak and the KNTV Transmitter Site.
Use of Ch. 11 at Willits, California
Petition to Amend §73.606(b) Table of Allotments (TV)
Prepared on Behalf of Granite Broadcasting Corporation
KNTV Ch. 11 San Jose, California
Prepared By Richard L. Biby
Communications Engineering Services, P.C.
Falls Church, Virginia February, 1993
KNTV Site
at Loma Prieta
Epicenter of 17 October, 1989
"Loma Prieta" Earthquake
Latitude 37° 02.33' ±1 km
Longitude 121° 52.76' ±1 km

Exhibit E-2
Tabulation of Pertinent TV Facilities with
Distance Computations and Separation Requirements

Channel 11 at Loma Prieta Peak
KNTV's Licensed Site
San Jose, California

Latitude: 37° 06' 40" - Longitude: 121° 50' 34"

Use of VHF-TV Ch. 11 at Willits, California
Petition to Amend §73.606(b) Table of Allotments, TV
Prepared on Behalf of Granite Broadcasting Corporation
KNTV Ch. 11 San Jose, California

Call Auth	City of License, St FCC File No.	Chan Zone	ERP (kW)	AMSL-m HAAT-m	Latitude Longitude	Br-to -from	Dist (km)	Req. (km)
KXTV	SACRAMENTO, CA	10 o	316	597	38-14-24	13.4	128.9	95.7
LIC	BLCT-861113KT	II		595	121-30-03	193.6	33.2	CLEAR
ALLOC	WILLITS, CA	11 -			39-32-28	332.5	305.7	304.9
		II			123-29-16	151.5	0.8	CLOSE
EFFECTIVE 1-4-88, SITE RESTRICTED 11.6 MILES NW, CP TO CH 11,								
KRXI	RENO, NV	11 o	178	2563	39-35-25	30.6	322.1	304.9
CP	BPCT-850509KU	II		856	119-55-40	211.8	17.2	CLEAR

End of Constraints Study TV Channel 11

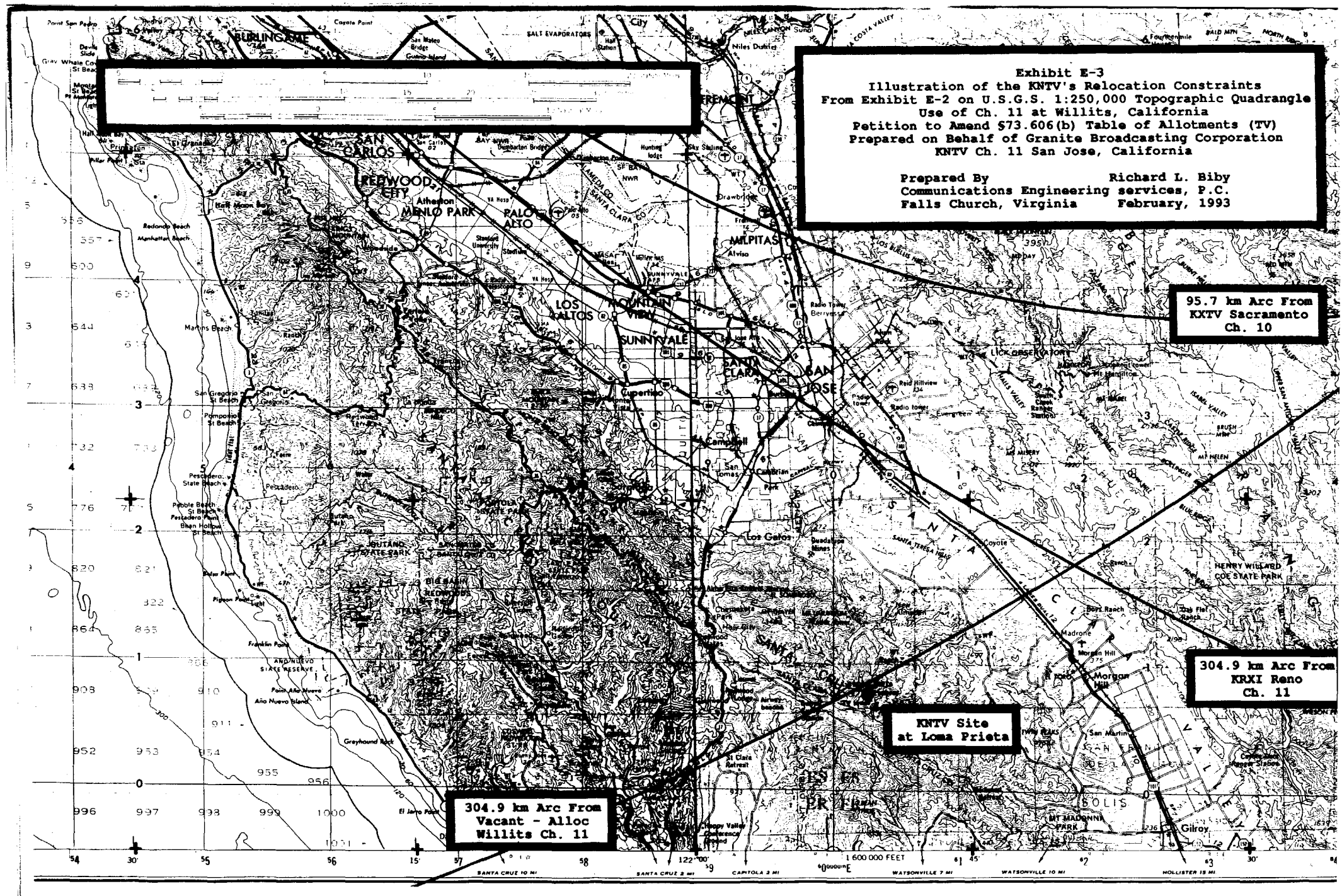


Exhibit E-3
Illustration of the KNTV's Relocation Constraints
From Exhibit E-2 on U.S.G.S. 1:250,000 Topographic Quadrangle
Use of Ch. 11 at Willits, California
Petition to Amend §73.606(b) Table of Allotments (TV)
Prepared on Behalf of Granite Broadcasting Corporation
KNTV Ch. 11 San Jose, California
Prepared By Richard L. Biby
Communications Engineering services, P.C.
Falls Church, Virginia February, 1993
95.7 km Arc From
KXTV Sacramento
Ch. 10
304.9 km Arc From
KRXI Reno
Ch. 11
KNTV Site
at Loma Prieta
304.9 km Arc From
Vacant - Alloc
Willits Ch. 11
SAN CARLOS
REDWOOD CITY
MENLO PARK
PALO ALTO
MILPITAS
LOS GATOS
MOUNTAIN VIEW
SUNNYVALE
SANTA CLARA
SAN JOSE
Cupertino
Campbell
Los Gatos
Morgan Hill
Gilroy
1 600 000 FEET

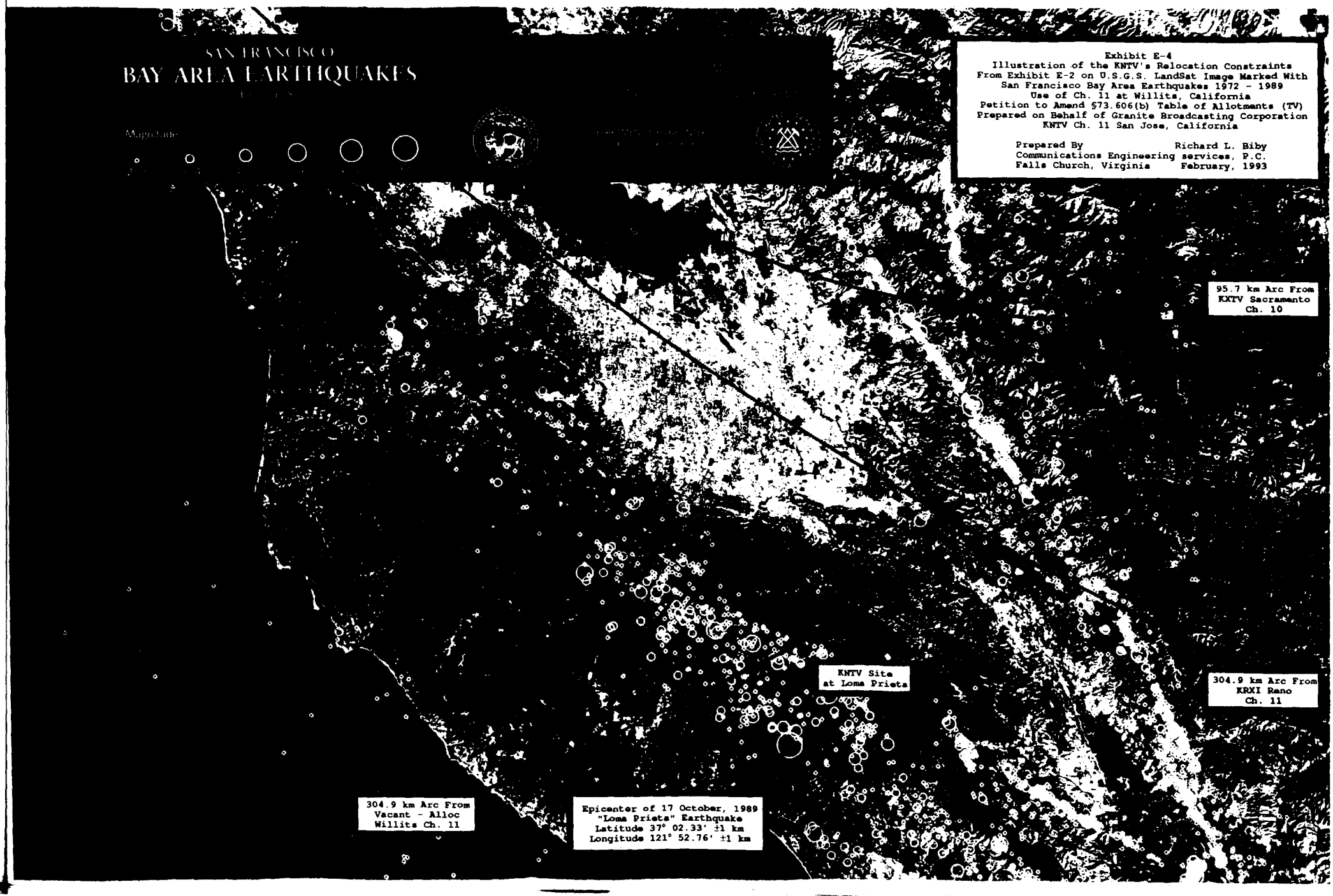


Exhibit E-4
Illustration of the KNTV's Relocation Constraints
From Exhibit E-2 on U.S.G.S. LandSat Image Marked With
San Francisco Bay Area Earthquakes 1972 - 1989
Use of Ch. 11 at Willits, California
Petition to Amend §73.606(b) Table of Allotments (TV)
Prepared on Behalf of Granite Broadcasting Corporation
KNTV Ch. 11 San Jose, California

Prepared By Richard L. Biby
Communications Engineering services, P.C.
Falls Church, Virginia February, 1993

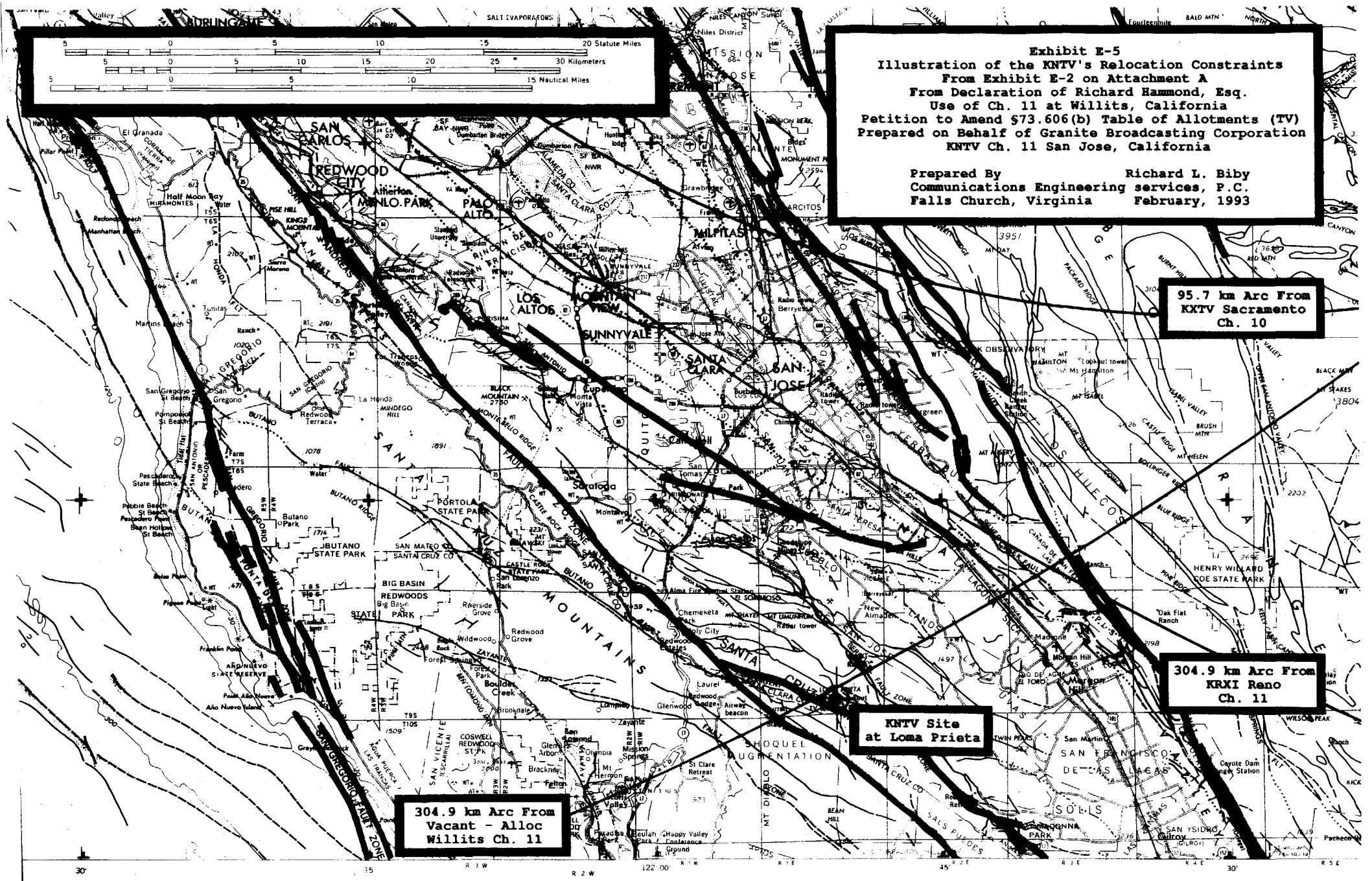


Exhibit E-5
Illustration of the KNTV's Relocation Constraints
From Exhibit E-2 on Attachment A
From Declaration of Richard Hammond, Esq.
Use of Ch. 11 at Willits, California
Petition to Amend §73.606(b) Table of Allotments (TV)
Prepared on Behalf of Granite Broadcasting Corporation
KNTV Ch. 11 San Jose, California

Prepared By Richard L. Biby
Communications Engineering services, P.C.
Falls Church, Virginia February, 1993

Exhibit E-6 (Page 1 of 20)
Tabulation of Pertinent TV Facilities with
Distance Computations and Separation Requirements

Channel 15 at Willits, California
Latitude: 39° 24' 36" - Longitude: 123° 21' 12"

Use of VHF-TV Ch. 11 at Willits, California
Petition to Amend §73.606(b) Table of Allotments, TV
Prepared on Behalf of Granite Broadcasting Corporation
KNTV Ch. 11 San Jose, California

Call Auth	City of License, St FCC File No.	Chan Zone	ERP (kW)	AMSL-m HAAT-m	Latitude Longitude	Br-to -from	Dist (km)	Req. (km)
ALLOC	REDDING, CA	16 o			40-34-57	31.8	153.9	87.7
		II			122-23-33	212.4	66.2	CLEAR
THIS CHANNEL RESERVED FOR LAND MOBILE USE.								
ALLOC	SAN FRANCISC/OAKLA,	16 o			37-46-39	155.4	198.9	87.7
					122-24-40	336.0	111.2	CLEAR
LAND MOBILE CHANNEL ONLY								
ALLOC	FORT BRAGG, CA	17 +			39-26-40	275.8	38.8	31.4
		II			123-48-06	95.5	7.4	CLEAR
THIS CHANNEL RESERVED FOR LAND MOBILE USE.								
ALLOC	CHICO, CA	18 o			39-43-43	74.3	135.0	31.4
		II			121-50-15	255.2	103.6	CLEAR
THIS CHANNEL RESERVED FOR LAND MOBILE USE.								
KRCBTV	COTATI, CA	22 -	67.6	804	38-20-54	150.0	135.9	95.7
LIC	BLET-850115KG	II	DA	620	122-34-27	330.5	40.2	CLEAR
KBVU	EUREKA, CA	29 o	16.2	583	40-49-32	340.9	166.6	95.7
CP MOD	BMPCT-911021KE	II	DA	334	124-00-05	160.5	70.9	CLEAR
KCVU	PARADISE, CA	30 o	2510	1194	39-57-45	65.9	153.7	119.9
LIC	BLCT-901010KF	II	DA	440	121-42-40	246.9	33.8	CLEAR

End of Constraints Study TV Channel 15

Prepared By Richard L. Biby
Communications Engineering Services, P.C.
Falls Church, Virginia February, 1993

Exhibit E-6 (Page 2 of 20)
Tabulation of Pertinent TV Facilities with
Distance Computations and Separation Requirements

Channel 21 at Willits, California
Latitude: 39° 24' 36" - Longitude: 123° 21' 12"

Use of VHF-TV Ch. 11 at Willits, California
Petition to Amend §73.606(b) Table of Allotments, TV
Prepared on Behalf of Granite Broadcasting Corporation
KNTV Ch. 11 San Jose, California

Call Auth	City of License, St FCC File No.	Chan Zone	ERP (kW)	AMSL-m HAAT-m	Latitude Longitude	Br-to -from	Dist (km)	Req. (km)
ALLOC	FORT BRAGG, CA	17 +			39-26-40	275.8	38.8	31.4
		II			123-48-06	95.5	7.4	CLEAR
THIS CHANNEL RESERVED FOR LAND MOBILE USE.								
ALLOC	CHICO, CA	18 o			39-43-43	74.3	135.0	31.4
		II			121-50-15	255.2	103.6	CLEAR
THIS CHANNEL RESERVED FOR LAND MOBILE USE.								
KOFYTV	SAN FRANCISCO, CA	20 -	3470	504	37-45-20	156.6	199.8	87.7
LIC	BLCT-851206KM	II	DA	472	122-27-05	337.2	112.1	CLEAR
KAMETV	RENO, NV	21 +	692	1704	39-35-04	85.2	306.5	280.8
LIC	BLCT-811104KG	II		189	119-47-51	267.5	25.7	CLEAR
KRCBTV	COTATI, CA	22 -	67.6	804	38-20-54	150.0	135.9	87.7
LIC	BLET-850115KG	II	DA	620	122-34-27	330.5	48.2	CLEAR
KCPM	CHICO, CA	24 +	5000	827	40-15-31	48.4	143.5	31.4
LIC	BLCT-851022KE	II	DA	564	122-05-20	229.3	112.1	CLEAR
ALLOC	OROVILLE, CA	28 o			39-30-30	85.4	155.9	95.7
		II			121-32-48	266.5	60.2	CLEAR
ALLOC	SAN FRANCISCO, CA	28 o			37-46-39	155.4	198.9	95.7
ADD					122-24-40	336.0	103.2	CLEAR
PROPOSED LAND MOBILE CHANNEL, DOCKET 85-172								

End of Constraints Study TV Channel 21

Prepared By Richard L. Biby
Communications Engineering Services, P.C.
Falls Church, Virginia February, 1993

Exhibit E-6 (Page 3 of 20)
Tabulation of Pertinent TV Facilities with
Distance Computations and Separation Requirements

Channel 25 at Willits, California
Latitude: 39° 24' 36" - Longitude: 123° 21' 12"

Use of VHF-TV Ch. 11 at Willits, California
Petition to Amend §73.606(b) Table of Allotments, TV
Prepared on Behalf of Granite Broadcasting Corporation
KNTV Ch. 11 San Jose, California

Call Auth	City of License, St FCC File No.	Chan Zone	ERP (kW)	AMSL-m HAAT-m	Latitude Longitude	Br-to -from	Dist (km)	Req. (km)
ALLOC	FORT BRAGG, CA	17 +			39-26-40	275.8	38.8	31.4
		II			123-48-06	95.5	7.4	CLEAR
THIS CHANNEL RESERVED FOR LAND MOBILE USE.								
ALLOC	CHICO, CA	18 o			39-43-43	74.3	135.0	95.7
		II			121-50-15	255.2	39.3	CLEAR
THIS CHANNEL RESERVED FOR LAND MOBILE USE.								
ALLOC	SAN FRANCISCO, CA	18 o			37-46-39	155.4	198.9	95.7
ADD					122-24-40	336.0	103.2	CLEAR
PROPOSED LAND MOBILE CHANNEL, DOCKET 85-172								
KRCBTV	COTATI, CA	22 -	67.6	804	38-20-54	150.0	135.9	31.4
LIC	BLET-850115KG	II	DA	620	122-34-27	330.5	104.5	CLEAR
KCPM	CHICO, CA	24 +	5000	827	40-15-31	48.4	143.5	87.7
LIC	BLCT-851022KE	II	DA	564	122-05-20	229.3	55.8	CLEAR
ALLOC	SAN FRANCISCO, CA	24 o			37-46-39	155.4	198.9	87.7
ADD					122-24-40	336.0	111.2	CLEAR
PROPOSED LAND MOBILE CHANNEL, DOCKET 85-172								
KCAH	WATSONVILLE, CA	25 +	52.5	968	36-45-23	150.6	336.4	280.8
LIC	BLET-891002KE	II	DA	670	121-30-05	331.8	55.6	CLEAR
ALLOC	FALLON, NV	25 o			39-28-24	87.5	394.1	280.8
		II			118-46-36	270.4	113.3	CLEAR
KTSF	SAN FRANCISCO, CA	26 -	2510	460	37-41-12	157.1	207.4	87.7
LIC	BLCT-2507	II	DA	421	122-26-03	337.6	119.7	CLEAR
KQEC	SAN FRANCISCO, CA	32 +	1320	523	37-45-20	156.6	199.8	95.7
LIC	BLET-840320KG	II	DA	491	122-27-05	337.2	104.1	CLEAR
KMTPTV	SAN FRANCISCO, CA	32 +	1320	523	37-45-20	156.6	199.8	95.7
LIC	BLET-910910KE	II	DA	491	122-27-05	337.2	104.1	CLEAR
KTXL	SACRAMENTO, CA	40 -	5000	600	38-16-18	127.8	204.3	119.9
LIC	BLCT-851112KI	II	DA	597	121-30-18	308.9	84.4	CLEAR

End of Constraints Study TV Channel 25

Prepared By Richard L. Biby
Communications Engineering Services, P.C.
Falls Church, Virginia February, 1993

Exhibit E-6 (Page 4 of 20)
Tabulation of Pertinent TV Facilities with
Distance Computations and Separation Requirements

Channel 27 at Willits, California
Latitude: 39° 24' 36" - Longitude: 123° 21' 12"

Use of VHF-TV Ch. 11 at Willits, California
Petition to Amend §73.606(b) Table of Allotments, TV
Prepared on Behalf of Granite Broadcasting Corporation
KNTV Ch. 11 San Jose, California

Call Auth	City of License, St FCC File No.	Chan Zone	ERP (kW)	AMSL-m HAAT-m	Latitude Longitude	Br-to -from	Dist (km)	Req. (km)
KOFYTV	SAN FRANCISCO, CA	20 -	3470	504	37-45-20	156.6	199.8	95.7
LIC	BLCT-851206KM	II	DA	472	122-27-05	337.2	104.1	CLEAR
KRCBTV	COTATI, CA	22 -	67.6	804	38-20-54	150.0	135.9	31.4
LIC	BLET-850115KG	II	DA	620	122-34-27	330.5	104.5	CLEAR
KCPM	CHICO, CA	24 +	5000	827	40-15-31	48.4	143.5	31.4
LIC	BLCT-851022KE	II	DA	564	122-05-20	229.3	112.1	CLEAR
KTSF	SAN FRANCISCO, CA	26 -	2510	460	37-41-12	157.1	207.4	87.7
LIC	BLCT-2507	II	DA	421	122-26-03	337.6	119.7	CLEAR
KRENTV	RENO, NV	27 +	1820	2973	39-18-47	91.0	299.3	280.8
LIC	BLCT-861016KF	II	DA	891	119-52-59	273.2	18.5	CLEAR
ALLOC	OROVILLE, CA	28 o			39-30-30	85.4	155.9	87.7
		II			121-32-48	266.5	68.2	CLEAR
ALLOC	SAN FRANCISCO, CA	28 o			37-46-39	155.4	198.9	87.7
ADD					122-24-40	336.0	111.2	CLEAR
PROPOSED	LAND MOBILE CHANNEL, DOCKET 85-172							
ALLOC	SAN FRANCISCO, CA	34 o			37-46-39	155.4	198.9	95.7
ADD					122-24-40	336.0	103.2	CLEAR
PROPOSED	LAND MOBILE DOCKET D85-172.							
KFCB	CONCORD, CA	42 o	1290	1098	37-53-34	142.7	210.7	119.9
LIC	BLCT-830630KF	II		856	121-53-53	323.6	90.8	CLEAR

End of Constraints Study TV Channel 27

Prepared By Richard L. Biby
Communications Engineering Services, P.C.
Falls Church, Virginia February, 1993

Exhibit E-6 (Page 5 of 20)
Tabulation of Pertinent TV Facilities with
Distance Computations and Separation Requirements

Channel 33 at Willits, California
Latitude: 39° 24' 36" - Longitude: 123° 21' 12"

Use of VHF-TV Ch. 11 at Willits, California
Petition to Amend §73.606(b) Table of Allotments, TV
Prepared on Behalf of Granite Broadcasting Corporation
KNTV Ch. 11 San Jose, California

Call Auth	City of License, St FCC File No.	Chan Zone	ERP (kW)	AMSL-m HAAT-m	Latitude Longitude	Br-to -from	Dist (km)	Req. (km)
ALLOC	CHICO, CA	18 o			39-43-43	74.3	135.0	119.9
		II			121-50-15	255.2	15.1	CLEAR
THIS CHANNEL RESERVED FOR LAND MOBILE USE.								
ALLOC	SAN FRANCISCO, CA	18 o			37-46-39	155.4	198.9	119.9
ADD					122-24-40	336.0	79.0	CLEAR
PROPOSED LAND MOBILE CHANNEL, DOCKET 85-172								
KCSO	MODESTO, CA	19 -	5000	593	38-14-20	128.2	208.2	95.7
APP	BPCT-900727KG	II	DA	590	121-28-52	309.3	112.5	CLEAR
KTSF	SAN FRANCISCO, CA	26 -	2510	460	37-41-12	157.1	207.4	95.7
LIC	BLCT-2507	II	DA	421	122-26-03	337.6	111.7	CLEAR
KQEC	SAN FRANCISCO, CA	32 +	1320	523	37-45-20	156.6	199.8	87.7
LIC	BLET-840320KG	II	DA	491	122-27-05	337.2	112.1	CLEAR
KMTPTV	SAN FRANCISCO, CA	32 +	1320	523	37-45-20	156.6	199.8	87.7
LIC	BLET-910910KE	II	DA	491	122-27-05	337.2	112.1	CLEAR
ALLOC	SAN FRANCISCO, CA	34 o			37-46-39	155.4	198.9	87.7
ADD					122-24-40	336.0	111.2	CLEAR
PROPOSED LAND MOBILE DOCKET D85-172.								
KTXL	SACRAMENTO, CA	40 -	5000	600	38-16-18	127.8	204.3	95.7
LIC	BLCT-851112KI	II	DA	597	121-30-18	308.9	108.6	CLEAR

End of Constraints Study TV Channel 33

Prepared By Richard L. Biby
Communications Engineering Services, P.C.
Falls Church, Virginia February, 1993

Tabulation of Pertinent TV Facilities with
Distance Computations and Separation Requirements

Channel 39 at Willits, California
Latitude: 39° 24' 36" - Longitude: 123° 21' 12"

Use of VHF-TV Ch. 11 at Willits, California
Petition to Amend §73.606(b) Table of Allotments, TV
Prepared on Behalf of Granite Broadcasting Corporation
KNTV Ch. 11 San Jose, California

Call Auth	City of License, St FCC File No.	Chan Zone	ERP (kW)	AMSL-m HAAT-m	Latitude Longitude	Br-to -from	Dist (km)	Req. (km)
KCPM	CHICO, CA	24 +	5000	827	40-15-31	48.4	143.5	119.9
LIC	BLCT-851022KE	II	DA	564	122-05-20	229.3	23.6	CLEAR
ALLOC	SAN FRANCISCO, CA	24 o			37-46-39	155.4	198.9	119.9
ADD					122-24-40	336.0	79.0	CLEAR
PROPOSED	LAND MOBILE CHANNEL, DOCKET 85-172							
KQEC	SAN FRANCISCO, CA	32 +	1320	523	37-45-20	156.6	199.8	95.7
LIC	BLET-840320KG	II	DA	491	122-27-05	337.2	104.1	CLEAR
KMTPTV	SAN FRANCISCO, CA	32 +	1320	523	37-45-20	156.6	199.8	95.7
LIC	BLET-910910KE	II	DA	491	122-27-05	337.2	104.1	CLEAR
KCNS	SAN FRANCISCO, CA	38 o	5000	476	37-45-20	156.6	199.8	87.7
LIC	BLCT-890926KE	II	DA	440	122-27-05	337.2	112.1	CLEAR
KTXL	SACRAMENTO, CA	40 -	5000	600	38-16-18	127.8	204.3	87.7
LIC	BLCT-851112KI	II	DA	597	121-30-18	308.9	116.6	CLEAR
ALLOC	CHICO, CA	46 o			39-43-54	74.1	135.0	95.7
		II			121-50-18	255.1	39.3	CLEAR

End of Constraints Study TV Channel 39

Prepared By Richard L. Biby
Communications Engineering Services, P.C.
Falls Church, Virginia February, 1993

Exhibit E-6 (Page 7 of 20)
Tabulation of Pertinent TV Facilities with
Distance Computations and Separation Requirements

Channel 41 at Willits, California
Latitude: 39° 24' 36" - Longitude: 123° 21' 12"

Use of VHF-TV Ch. 11 at Willits, California
Petition to Amend §73.606(b) Table of Allotments, TV
Prepared on Behalf of Granite Broadcasting Corporation
KNTV Ch. 11 San Jose, California

Call Auth	City of License, St FCC File No.	Chan Zone	ERP (kW)	AMSL-m HAAT-m	Latitude Longitude	Br-to -from	Dist (km)	Req. (km)
KTSF	SAN FRANCISCO, CA	26 -	2510	460	37-41-12	157.1	207.4	119.9
LIC	BLCT-2507	II	DA	421	122-26-03	337.6	87.5	CLEAR
ALLOC	SAN FRANCISCO, CA	34 o			37-46-39	155.4	198.9	95.7
ADD					122-24-40	336.0	103.2	CLEAR
PROPOSED LAND MOBILE DOCKET D85-172.								
KTXL	SACRAMENTO, CA	40 -	5000	600	38-16-18	127.8	204.3	87.7
LIC	BLCT-851112KI	II	DA	597	121-30-18	308.9	116.6	CLEAR
ALLOC	YOSEMITE VALLEY, CA	41 o			37-44-42	118.3	376.7	280.8
		II			119-35-12	300.7	95.9	CLEAR
EFFECTIVE 5-16-88. CITY AS SHOWN ON APPLICATION.								
ALLOC	CHICO, CA	46 o			39-43-54	74.1	135.0	31.4
		II			121-50-18	255.1	103.6	CLEAR

End of Constraints Study TV Channel 41

Prepared By Richard L. Biby
Communications Engineering Services, P.C.
Falls Church, Virginia February, 1993