

FIGURE 3.3-1 MAXIMUM CONSIDERED EARTHQUAKE GROUND MOTION FOR THE CONTERMINOUS UNITED STATES OF 0.2 SEC SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B

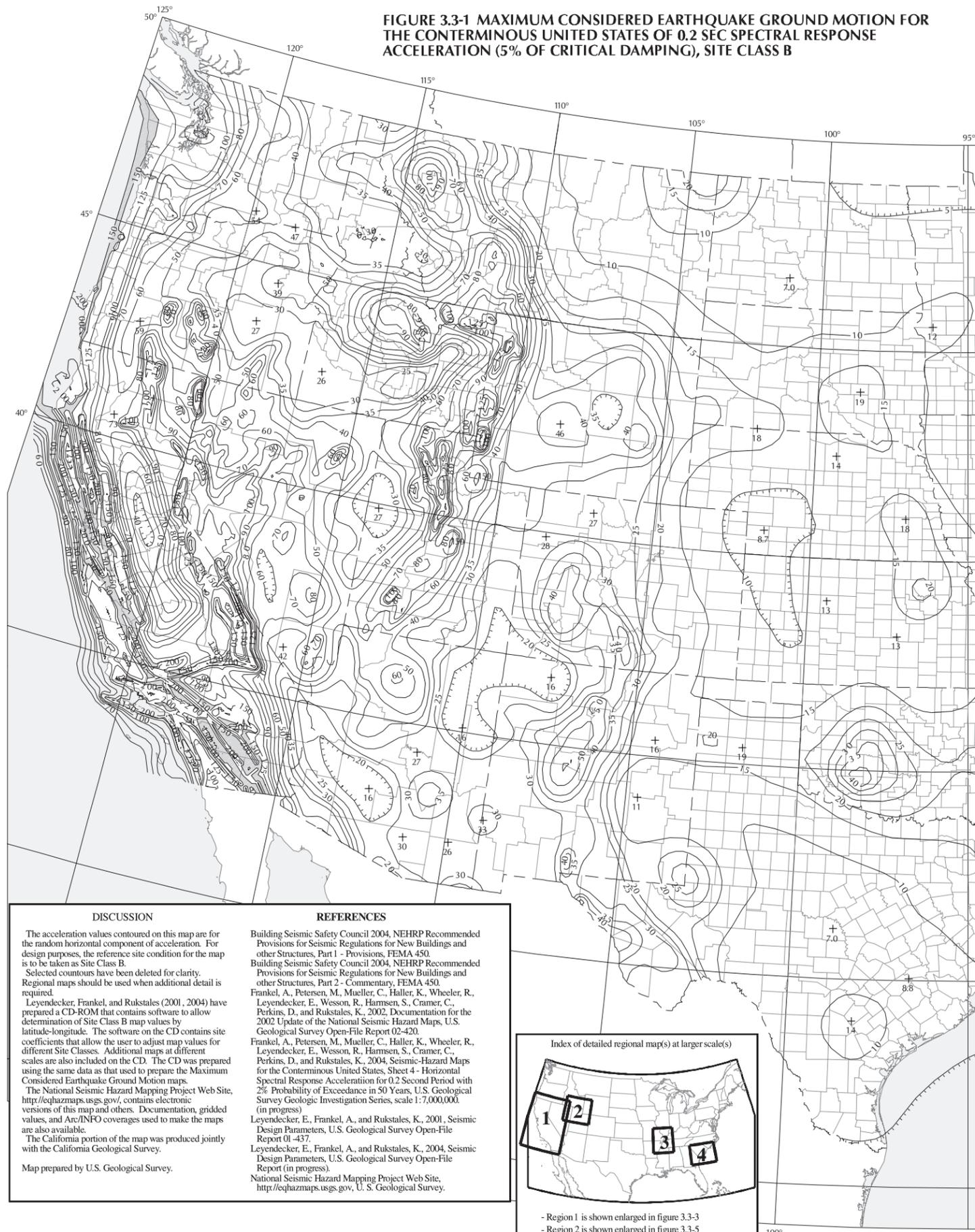
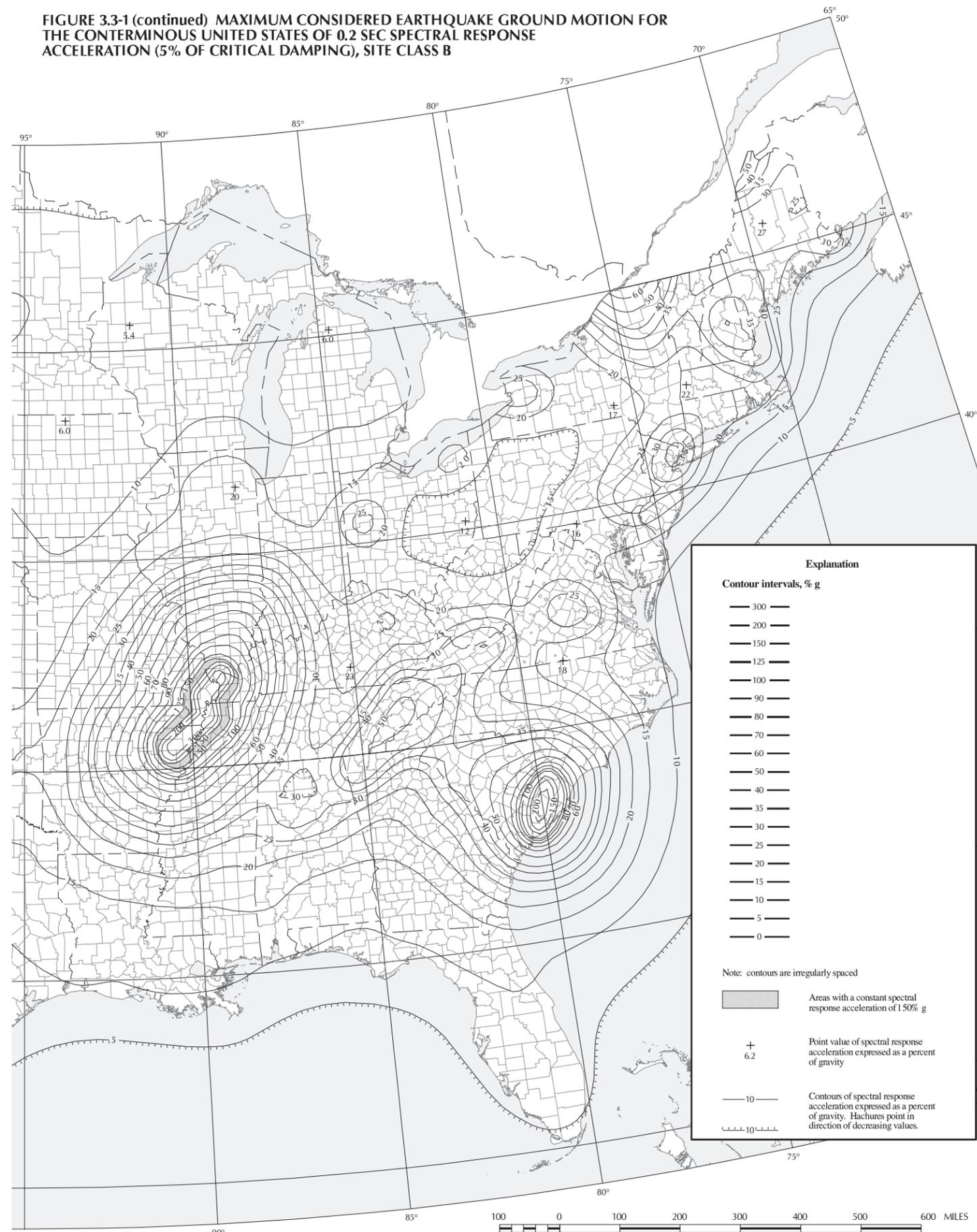


FIGURE 3.3-1 (continued) MAXIMUM CONSIDERED EARTHQUAKE GROUND MOTION FOR THE CONTERMINOUS UNITED STATES OF 0.2 SEC SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B



Explanation

Contour intervals, % g

- 300 —
- 200 —
- 150 —
- 100 —
- 90 —
- 80 —
- 70 —
- 60 —
- 50 —
- 40 —
- 35 —
- 30 —
- 25 —
- 20 —
- 15 —
- 10 —
- 5 —
- 0 —

Note: contours are irregularly spaced

- Areas with a constant spectral response acceleration of 150% g
- + 6.2 Point value of spectral response acceleration expressed as a percent of gravity
- 10 — Contours of spectral response acceleration expressed as a percent of gravity. Hachures point in direction of decreasing values.

DISCUSSION

The acceleration values contoured on this map are for the random horizontal component of acceleration. For design purposes, the reference site condition for the map is to be taken as Site Class B.

Selected contours have been deleted for clarity.

Regional maps should be used when additional detail is required.

Leyendecker, Frankel, and Rukstales (2001, 2004) have prepared a CD-ROM that contains software to allow determination of Site Class B map values by latitude-longitude. The software on the CD contains site coefficients that allow the user to adjust map values for different Site Classes. Additional maps at different scales are also included on the CD. The CD was prepared using the same data as that used to prepare the Maximum Considered Earthquake Ground Motion maps.

The National Seismic Hazard Mapping Project Web Site, <http://eqhazmaps.usgs.gov/>, contains electronic versions of this map and others. Documentation, gridded values, and Arc/INFO coverages used to make the maps are also available.

The California portion of the map was produced jointly with the California Geological Survey.

REFERENCES

Building Seismic Safety Council 2004, NEHRP Recommended Provisions for Seismic Regulations for New Buildings and other Structures, Part 1 - Provisions, FEMA 450.

Building Seismic Safety Council 2004, NEHRP Recommended Provisions for Seismic Regulations for New Buildings and other Structures, Part 2 - Commentary, FEMA 450.

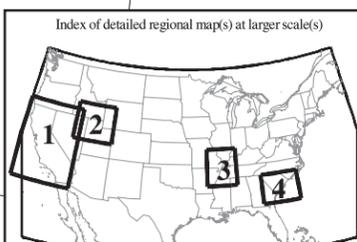
Frankel, A., Petersen, M., Mueller, C., Haller, K., Wheeler, R., Leyendecker, E., Wesson, R., Harmsen, S., Cramer, C., Perkins, D., and Rukstales, K., 2002, Documentation for the 2002 Update of the National Seismic Hazard Maps, U.S. Geological Survey Open-File Report 02-420.

Frankel, A., Petersen, M., Mueller, C., Haller, K., Wheeler, R., Leyendecker, E., Wesson, R., Harmsen, S., Cramer, C., Perkins, D., and Rukstales, K., 2004, Seismic-Hazard Maps for the Conterminous United States, Sheet 4 - Horizontal Spectral Response Acceleration for 0.2 Second Period with 2% Probability of Exceedance in 50 Years, U.S. Geological Survey Geologic Investigation Series, scale 1:7,000,000, (in progress)

Leyendecker, E., Frankel, A., and Rukstales, K., 2001, Seismic Design Parameters, U.S. Geological Survey Open-File Report 01-437.

Leyendecker, E., Frankel, A., and Rukstales, K., 2004, Seismic Design Parameters, U.S. Geological Survey Open-File Report (in progress).

National Seismic Hazard Mapping Project Web Site, <http://eqhazmaps.usgs.gov/>, U. S. Geological Survey.



- Region 1 is shown enlarged in figure 3.3-3
- Region 2 is shown enlarged in figure 3.3-5
- Region 3 is shown enlarged in figure 3.3-7
- Region 4 is shown enlarged in figure 3.3-9

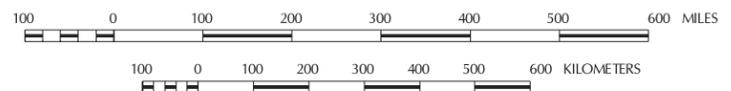


FIGURE 3.3-2 MAXIMUM CONSIDERED EARTHQUAKE GROUND MOTION FOR THE CONTERMINOUS UNITED STATES OF 1.0 SEC SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B

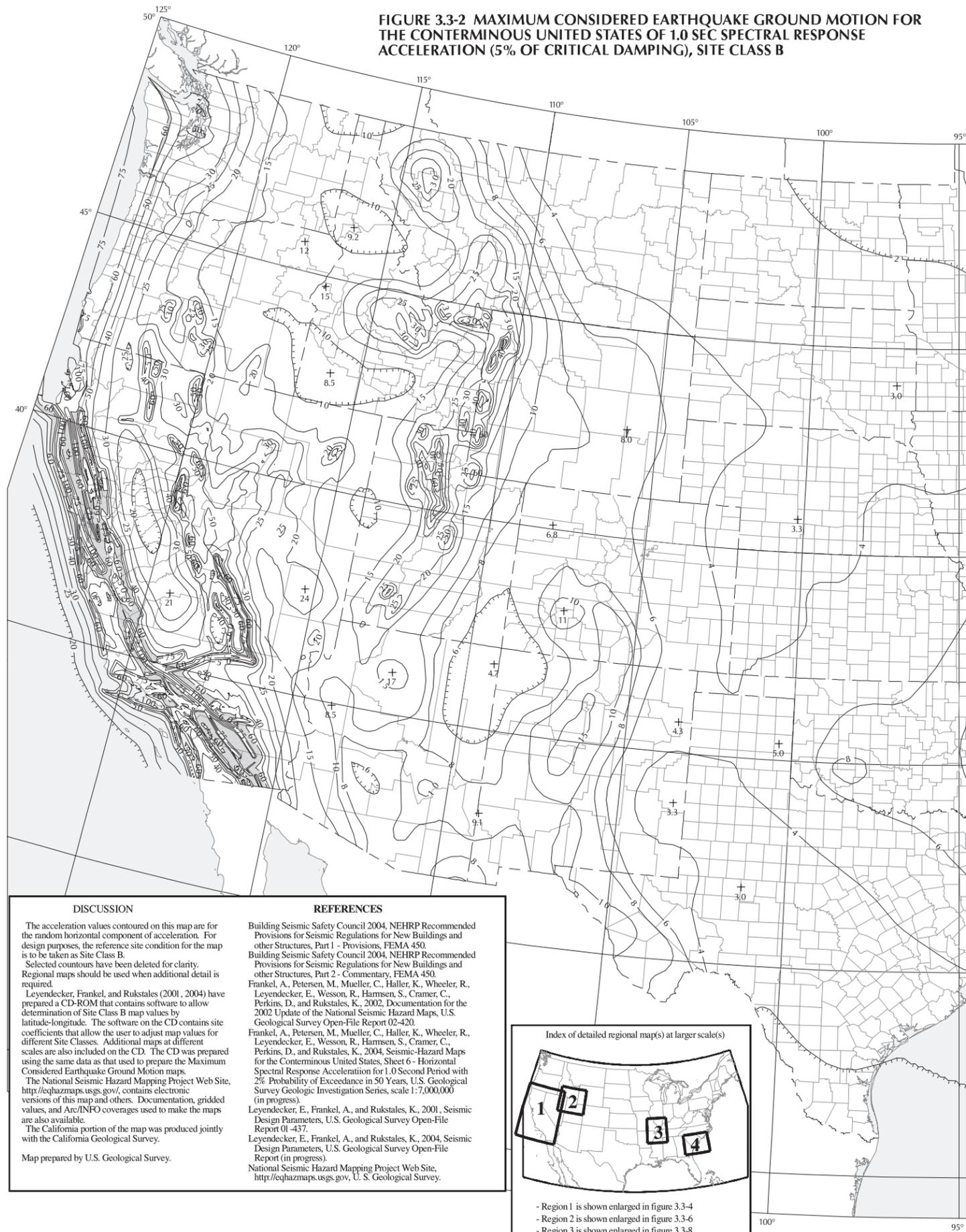
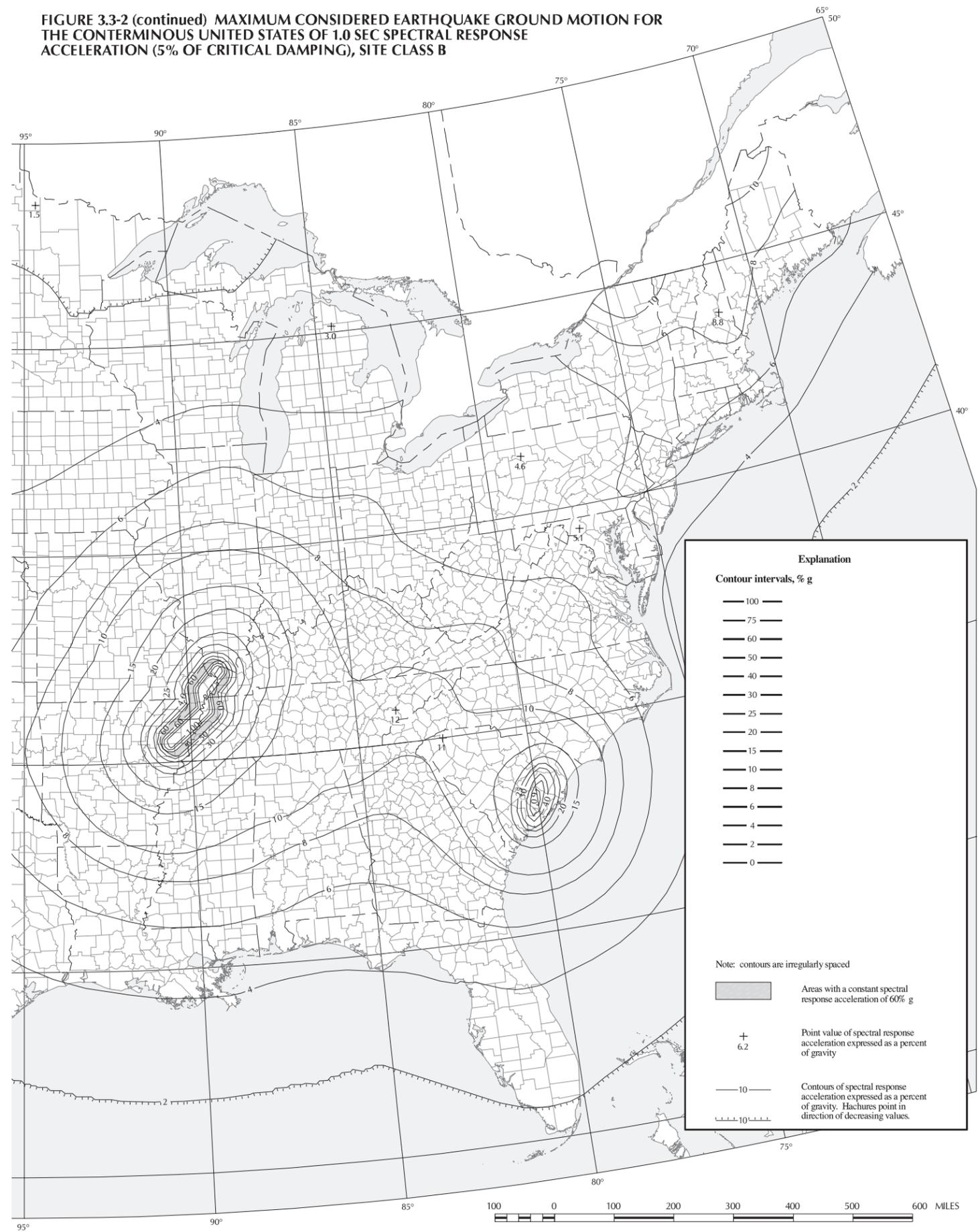


FIGURE 3.3-2 (continued) MAXIMUM CONSIDERED EARTHQUAKE GROUND MOTION FOR THE CONTERMINOUS UNITED STATES OF 1.0 SEC SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B



DISCUSSION

The acceleration values contoured on this map are for the random horizontal component of acceleration. For design purposes, the reference site condition for the map is to be taken as Site Class B.

Selected contours have been deleted for clarity. Regional maps should be used when additional detail is required.

Leyendecker, Frankel, and Rukstales (2001, 2004) have prepared a CD-ROM that contains software to allow determination of Site Class B map values by latitude-longitude. The software on the CD contains site coefficients that allow the user to adjust map values for different Site Classes. Additional maps at different scales are also included on the CD. The CD was prepared using the same data as that used to prepare the Maximum Considered Earthquake Ground Motion maps.

The National Seismic Hazard Mapping Project Web Site, <http://eqhazmaps.usgs.gov>, contains electronic versions of this map and others. Documentation, gridded values, and Arc/INFO coverages used to make the maps are also available.

The California portion of the map was produced jointly with the California Geological Survey.

Map prepared by U.S. Geological Survey.

REFERENCES

Building Seismic Safety Council 2004, NEHRP Recommended Provisions for Seismic Regulations for New Buildings and other Structures, Part 1 - Provisions, FEMA 450.

Building Seismic Safety Council 2004, NEHRP Recommended Provisions for Seismic Regulations for New Buildings and other Structures, Part 2 - Commentary, FEMA 450.

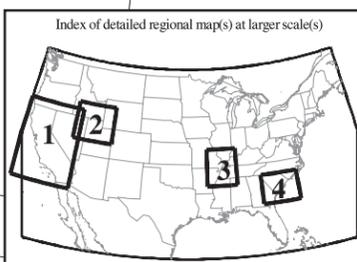
Frankel, A., Petersen, M., Mueller, C., Haller, K., Wheeler, R., Leyendecker, E., Wesson, R., Harmsen, S., Cramer, C., Perkins, D., and Rukstales, K., 2002, Documentation for the 2002 Update of the National Seismic Hazard Maps, U.S. Geological Survey Open-File Report 02-420.

Frankel, A., Petersen, M., Mueller, C., Haller, K., Wheeler, R., Leyendecker, E., Wesson, R., Harmsen, S., Cramer, C., Perkins, D., and Rukstales, K., 2004, Seismic-Hazard Maps for the Conterminous United States, Sheet 6 - Horizontal Spectral Response Acceleration for 1.0 Second Period with 2% Probability of Exceedance in 50 Years, U.S. Geological Survey Geologic Investigation Series, scale 1:7,000,000 (in progress).

Leyendecker, E., Frankel, A., and Rukstales, K., 2001, Seismic Design Parameters, U.S. Geological Survey Open-File Report 01-437.

Leyendecker, E., Frankel, A., and Rukstales, K., 2004, Seismic Design Parameters, U.S. Geological Survey Open-File Report (in progress).

National Seismic Hazard Mapping Project Web Site, <http://eqhazmaps.usgs.gov>, U. S. Geological Survey.



- Region 1 is shown enlarged in figure 3.3-4
 - Region 2 is shown enlarged in figure 3.3-6
 - Region 3 is shown enlarged in figure 3.3-8
 - Region 4 is shown enlarged in figure 3.3-9

Explanation

Contour intervals, % g

- 100 —
- 75 —
- 60 —
- 50 —
- 40 —
- 30 —
- 25 —
- 20 —
- 15 —
- 10 —
- 8 —
- 6 —
- 4 —
- 2 —
- 0 —

Note: contours are irregularly spaced

■ Areas with a constant spectral response acceleration of 60% g

+ 6.2 Point value of spectral response acceleration expressed as a percent of gravity

— 10 — Contours of spectral response acceleration expressed as a percent of gravity. Hachures point in direction of decreasing values.

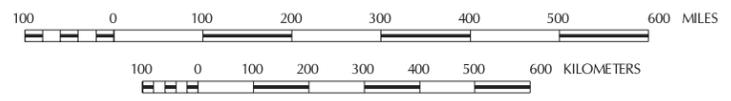


FIGURE 3.3-3 MAXIMUM CONSIDERED EARTHQUAKE GROUND MOTION FOR REGION 1 OF 0.2 SEC SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B

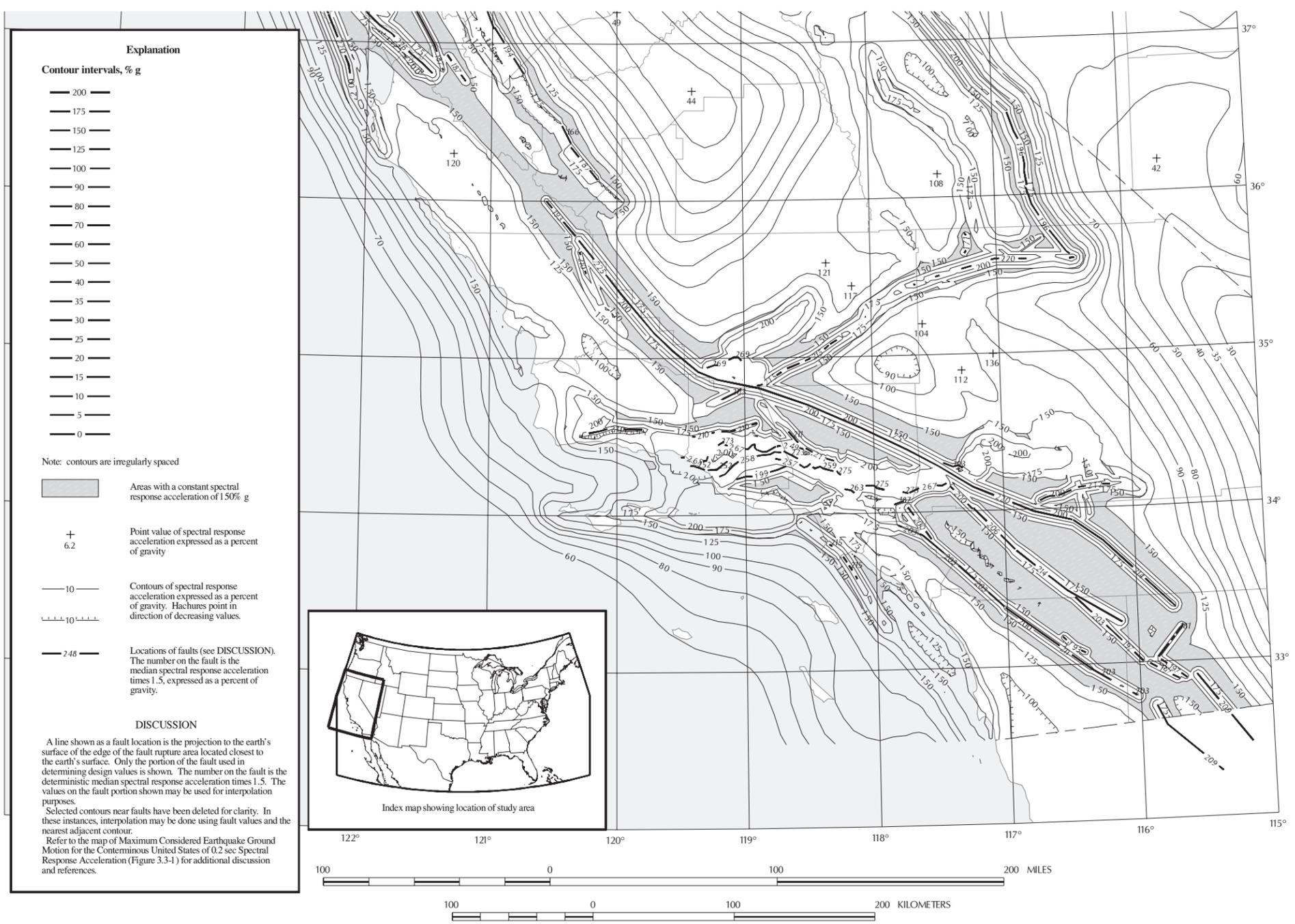
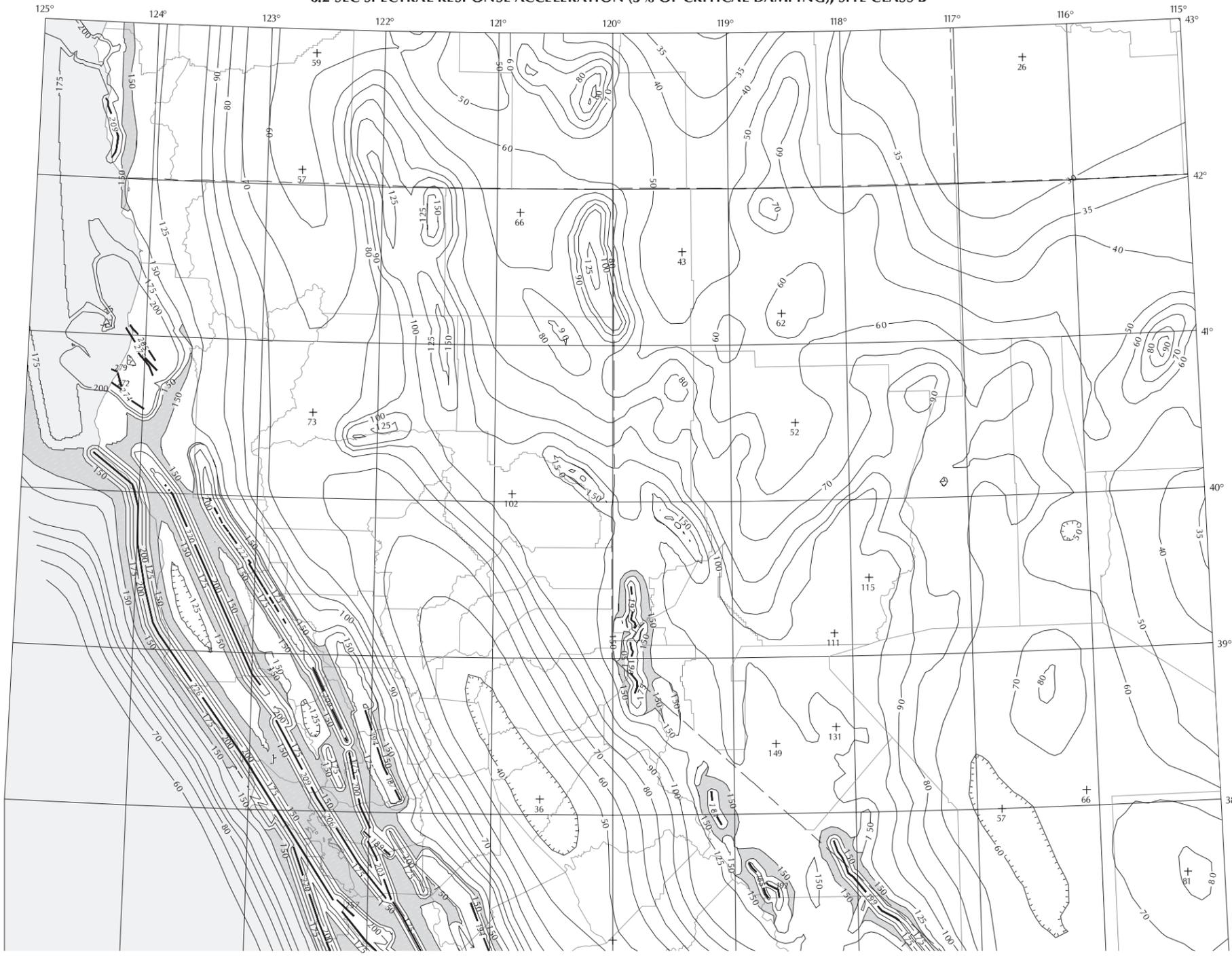


FIGURE 3.3-3 (continued) MAXIMUM CONSIDERED EARTHQUAKE GROUND MOTION FOR REGION 1 OF 0.2 SEC SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B

FIGURE 3.3-4 MAXIMUM CONSIDERED EARTHQUAKE GROUND MOTION FOR REGION 1 OF 1.0 SEC SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B

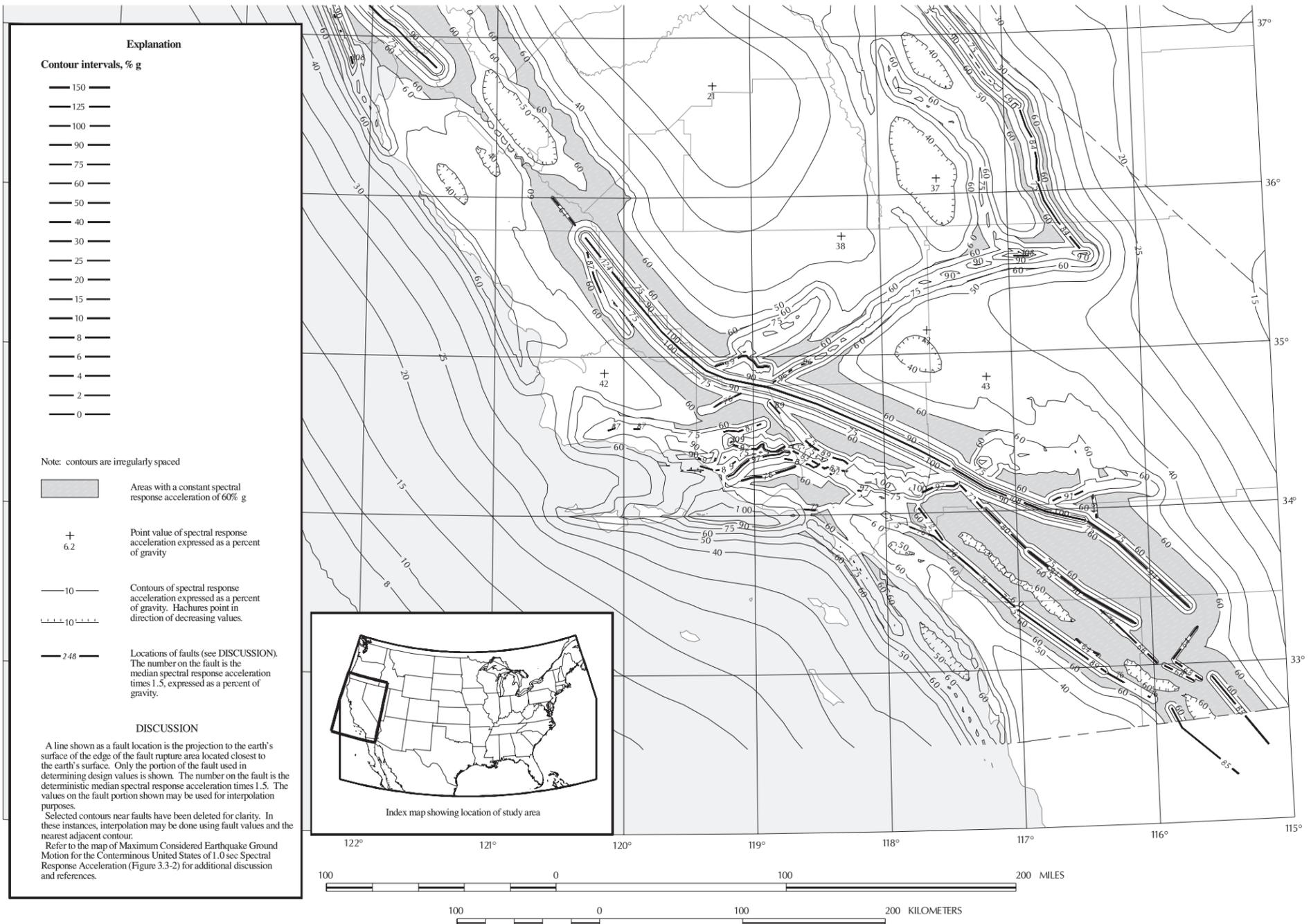
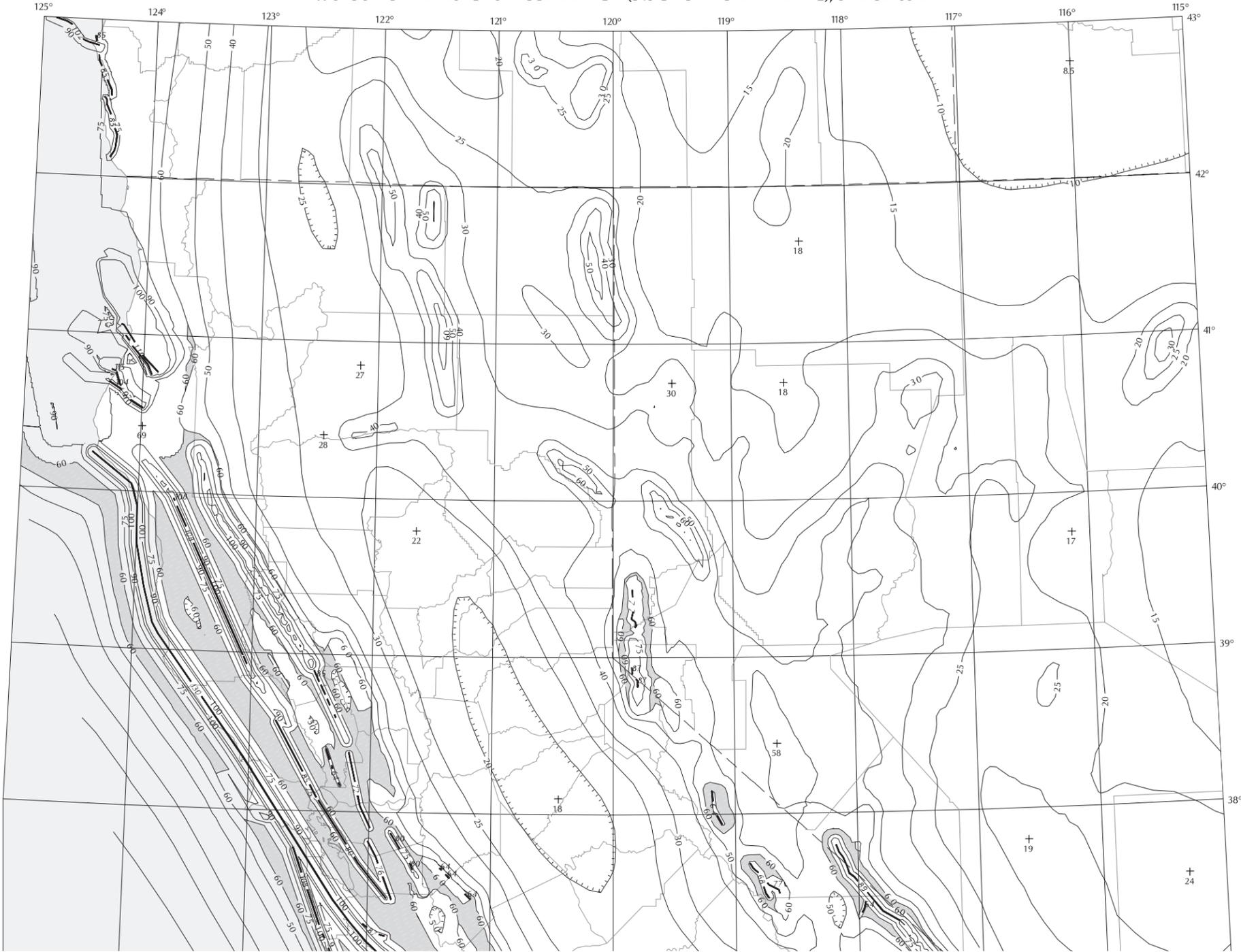
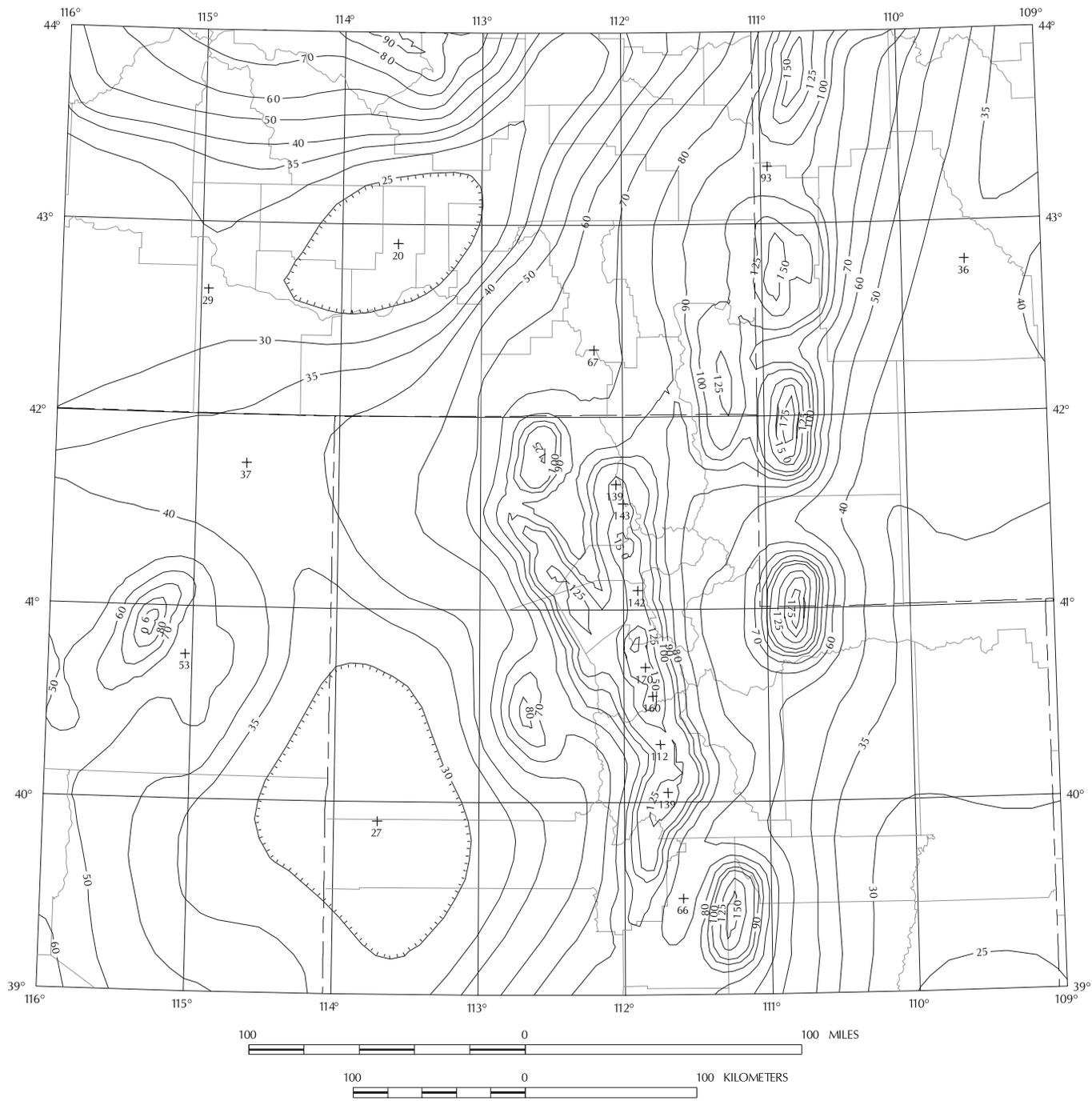


FIGURE 3.3-4 (continued) MAXIMUM CONSIDERED EARTHQUAKE GROUND MOTION FOR REGION 1 OF 1.0 SEC SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B



Explanation

Contour intervals, % g

- 200 —
- 175 —
- 150 —
- 125 —
- 100 —
- 90 —
- 80 —
- 70 —
- 60 —
- 50 —
- 40 —
- 35 —
- 30 —
- 25 —
- 20 —
- 15 —
- 10 —
- 5 —
- 0 —

Note: contours are irregularly spaced

+
6.2

— 10 —

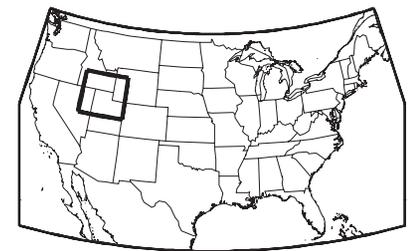
- - - 10 - - -

Point value of spectral response acceleration expressed as a percent of gravity

Contours of spectral response acceleration expressed as a percent of gravity. Hachures point in direction of decreasing values.

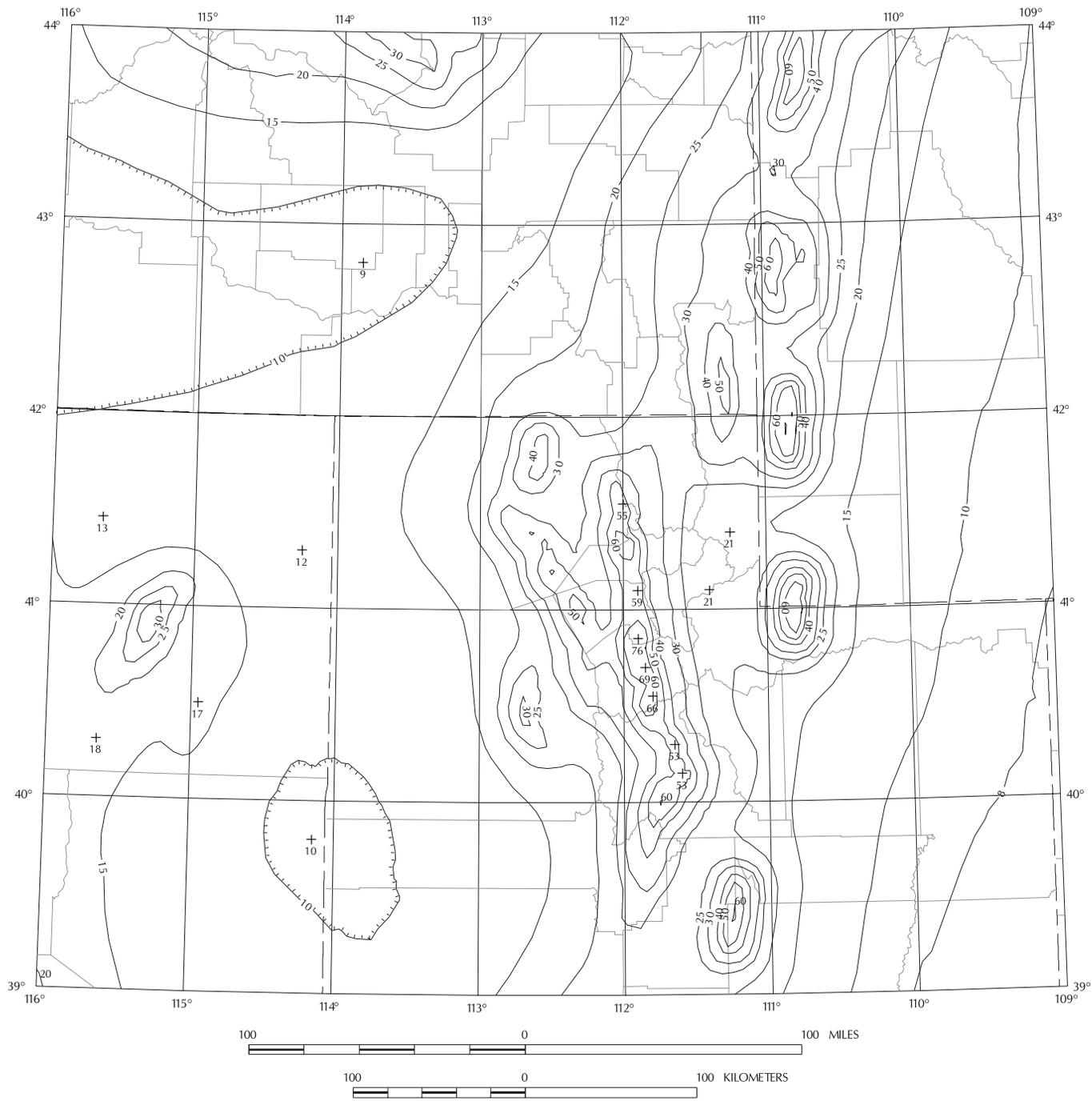
DISCUSSION

Refer to the map of Maximum Considered Earthquake Ground Motion for the Conterminous United States of 0.2 sec Spectral Response Acceleration (Figure 3.3-1) for discussion and references.



Index map showing location of study area

FIGURE 3.3-5 MAXIMUM CONSIDERED EARTHQUAKE GROUND MOTION FOR REGION 2 OF 0.2 SEC SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B



Explanation

Contour intervals, % g

- 150 —
- 125 —
- 100 —
- 90 —
- 75 —
- 60 —
- 50 —
- 40 —
- 30 —
- 25 —
- 20 —
- 15 —
- 10 —
- 8 —
- 6 —
- 4 —
- 2 —
- 0 —

Note: contours are irregularly spaced

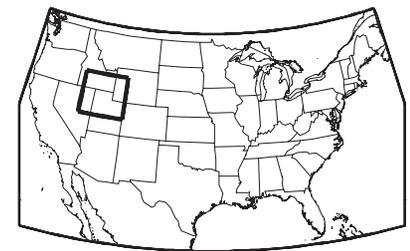
+ 6.2 Point value of spectral response acceleration expressed as a percent of gravity

— 10 — Contours of spectral response acceleration expressed as a percent of gravity. Hachures point in direction of decreasing values.

— 10 — (with hachures)

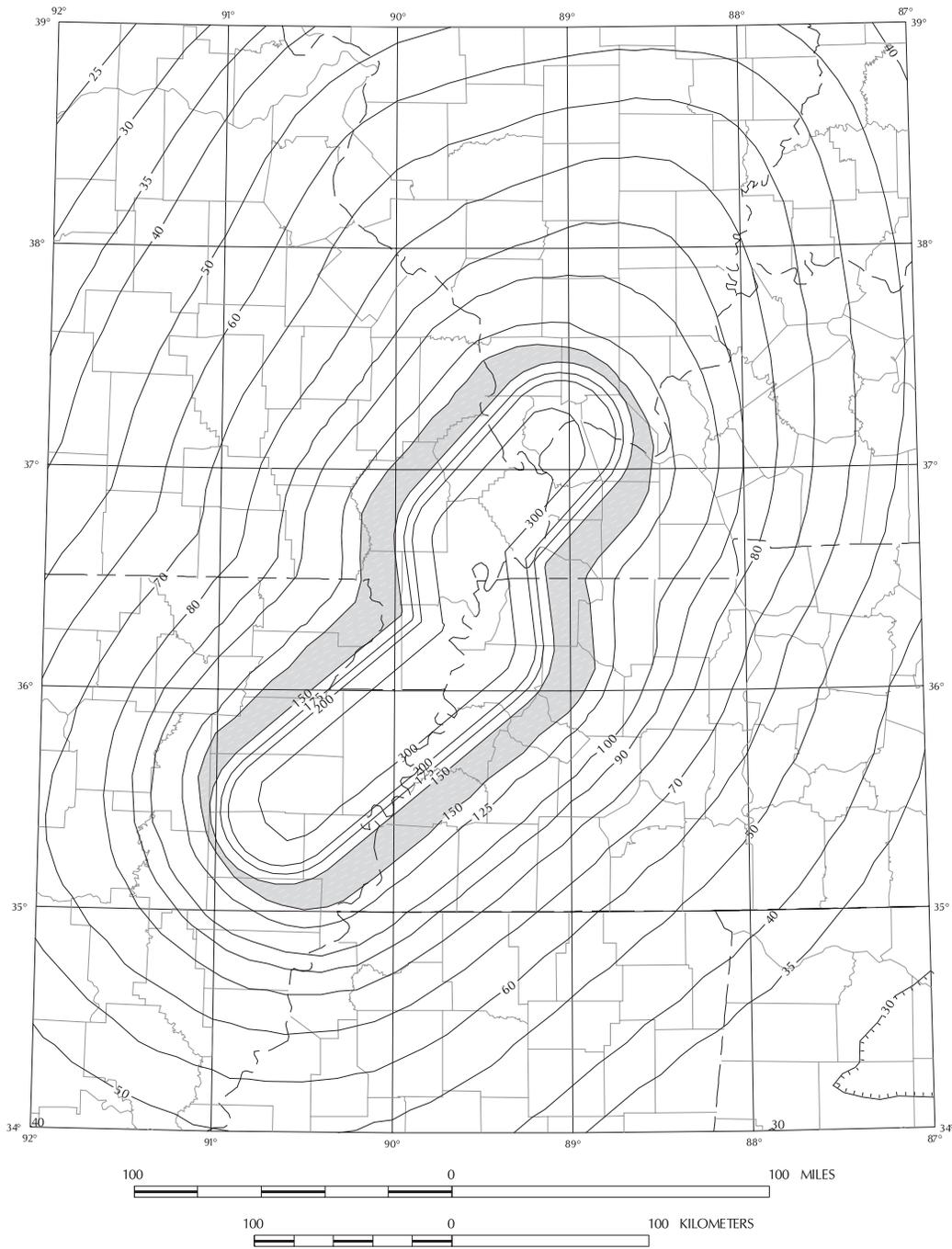
DISCUSSION

Refer to the map of Maximum Considered Earthquake Ground Motion for the Conterminous United States of 1.0 sec Spectral Response Acceleration (Figure 3.3-2) for discussion and references.



Index map showing location of study area

FIGURE 3.3-6 MAXIMUM CONSIDERED EARTHQUAKE GROUND MOTION FOR REGION 2 OF 1.0 SEC SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B



Explanation

Contour intervals, % g

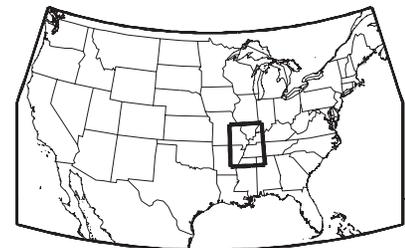
- 200 —
- 175 —
- 150 —
- 125 —
- 100 —
- 90 —
- 80 —
- 70 —
- 60 —
- 50 —
- 40 —
- 35 —
- 30 —
- 25 —
- 20 —
- 15 —
- 10 —
- 5 —
- 0 —

Note: contours are irregularly spaced

- Areas with a constant spectral response acceleration of 150% g
- Point value of spectral response acceleration expressed as a percent of gravity
- 10 — Contours of spectral response acceleration expressed as a percent of gravity. Hachures point in direction of decreasing values.
- 10 —

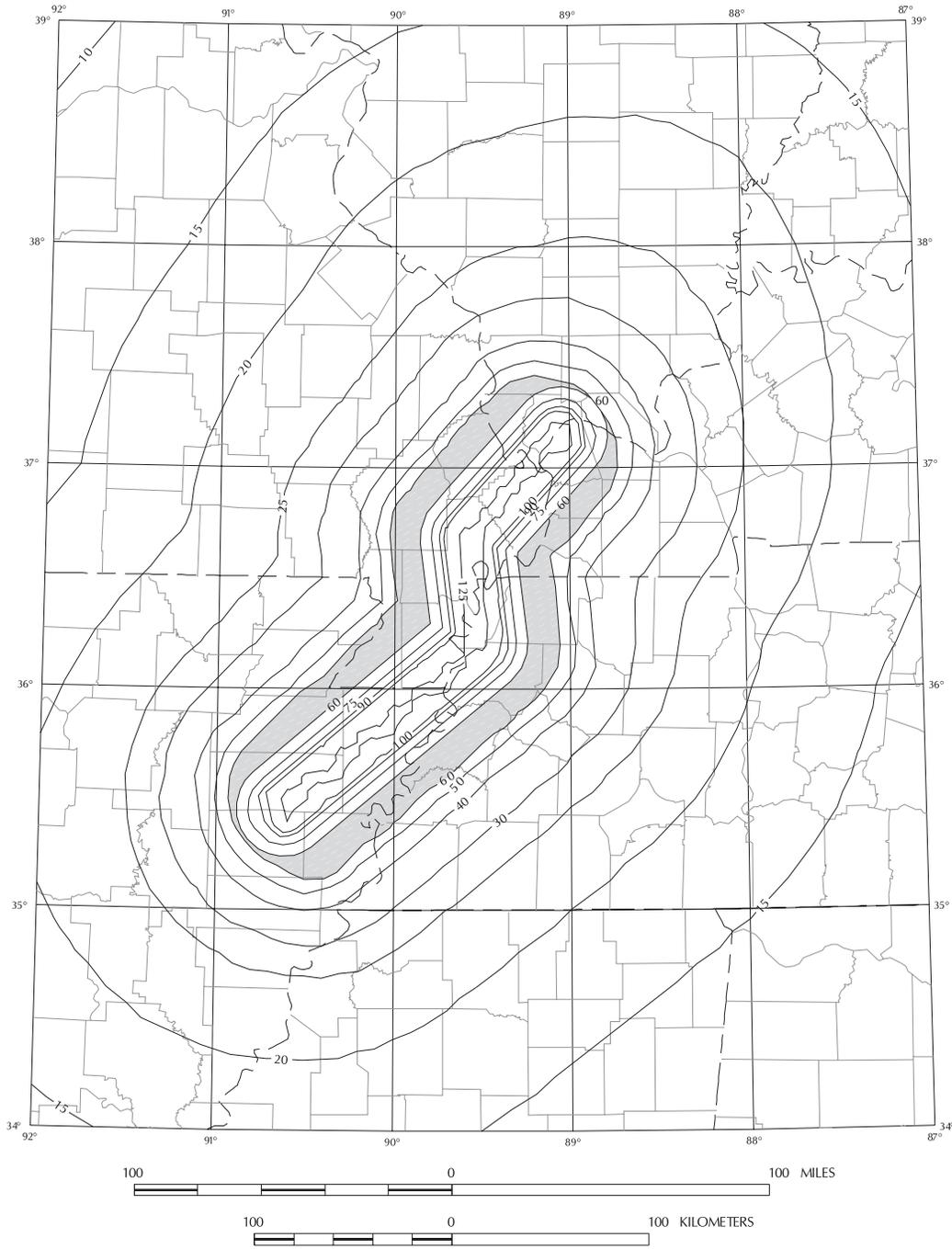
DISCUSSION

Refer to the map of Maximum Considered Earthquake Ground Motion for the Contiguous United States of 0.2 sec Spectral Response Acceleration (Figure 3.3-1) for discussion and references.



Index map showing location of study area

FIGURE 3.3-7 MAXIMUM CONSIDERED EARTHQUAKE GROUND MOTION FOR REGION 3 OF 0.2 SEC SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B



Explanation

Contour intervals, % g

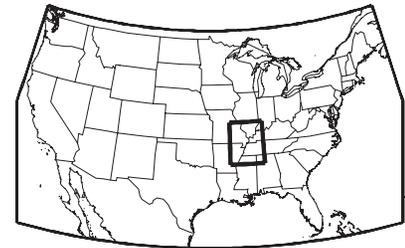
- 150 —
- 125 —
- 100 —
- 90 —
- 75 —
- 60 —
- 50 —
- 40 —
- 30 —
- 25 —
- 20 —
- 15 —
- 10 —
- 8 —
- 6 —
- 4 —
- 2 —
- 0 —

Note: contours are irregularly spaced

- Areas with a constant spectral response acceleration of 60% g
- Point value of spectral response acceleration expressed as a percent of gravity
- Contours of spectral response acceleration expressed as a percent of gravity. Hachures point in direction of decreasing values.

DISCUSSION

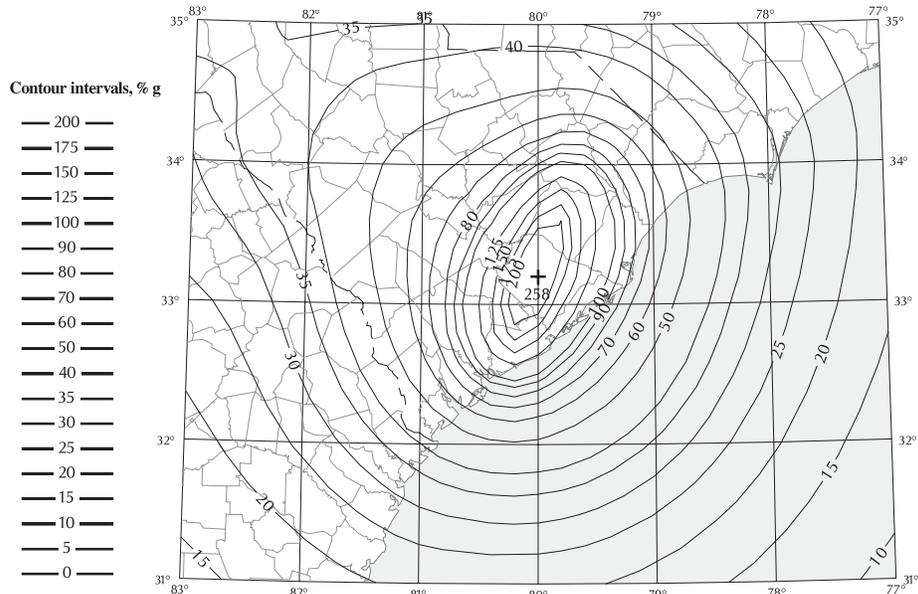
Refer to the map of Maximum Considered Earthquake Ground Motion for the Conterminous United States of 1.0 sec Spectral Response Acceleration (Figure 3.3-2) for discussion and references.



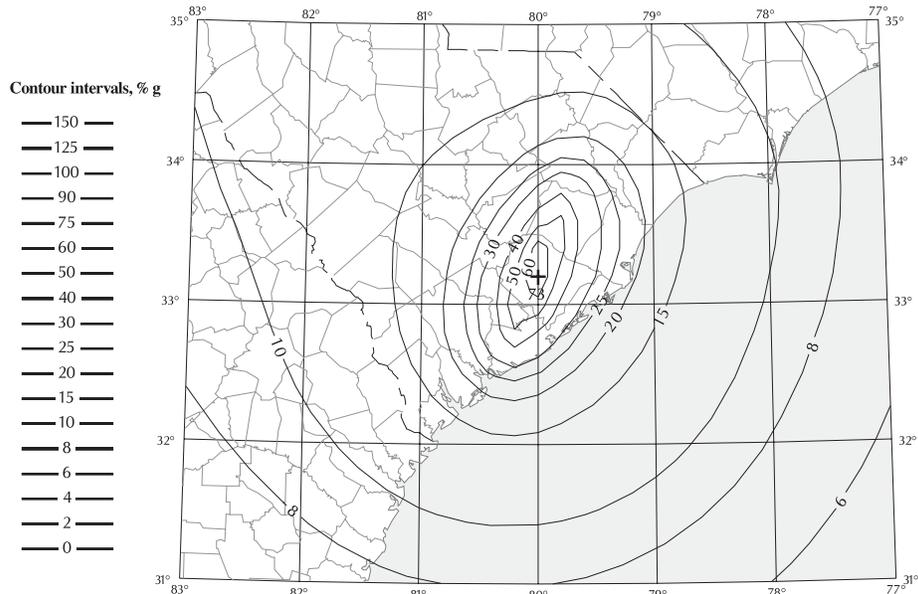
Index map showing location of study area

FIGURE 3.3-8 MAXIMUM CONSIDERED EARTHQUAKE GROUND MOTION FOR REGION 3 OF 1.0 SEC SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B

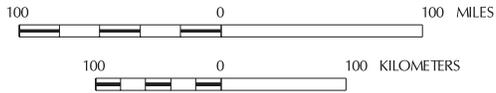
FIGURE 3.3-9 MAXIMUM CONSIDERED EARTHQUAKE GROUND MOTION FOR REGION 4 OF 0.2 AND 1.0 SEC SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B



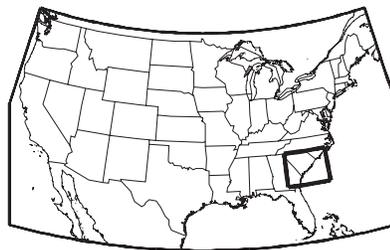
0.2 SEC SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)



1.0 SEC SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)



Explanation	
+ 6.2	Point value of spectral response acceleration expressed as a percent of gravity
— 10 —	Contours of spectral response acceleration expressed as a percent of gravity. Hachures point in direction of decreasing values.
- - - 10 - - -	
DISCUSSION	
Refer to the maps of Maximum Considered Earthquake Ground Motion for the Conterminous United States of 0.2 and 1.0 sec Spectral Response Acceleration (Figures 3.3-1 and 3.3-2) for discussion and references.	

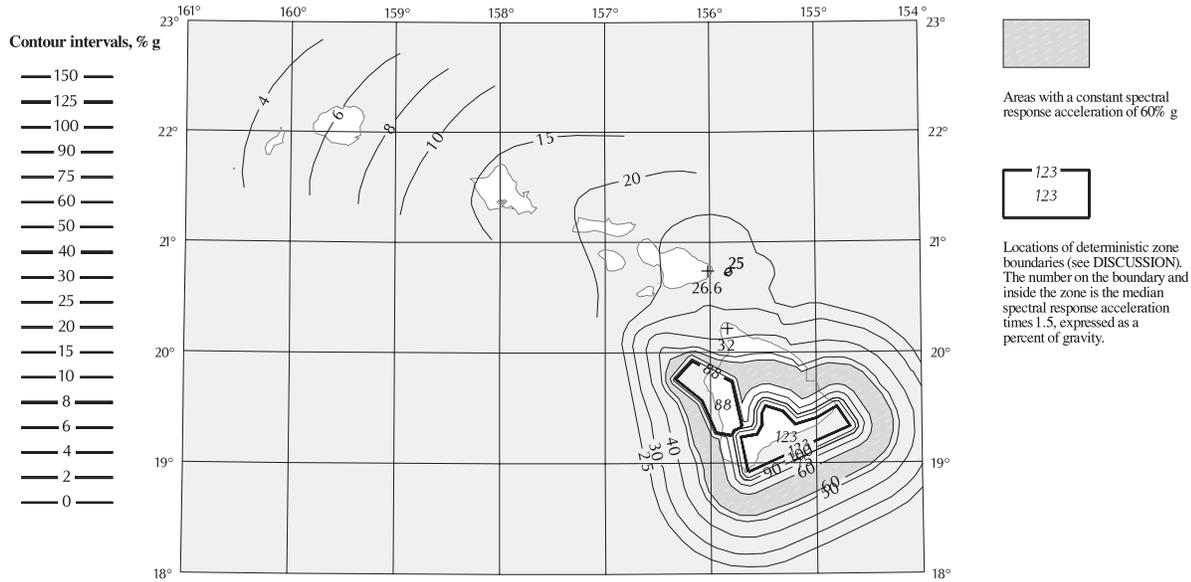


Index map showing location of study area

FIGURE 3.3-10 MAXIMUM CONSIDERED EARTHQUAKE GROUND MOTION FOR HAWAII OF 0.2 AND 1.0 SEC SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B

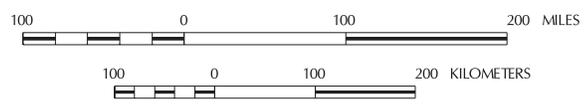


0.2 SEC SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)



1.0 SEC SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)

Explanation	
+	Point value of spectral response acceleration expressed as a percent of gravity
6.2	
— 10 —	Contours of spectral response acceleration expressed as a percent of gravity. Hachures point in direction of decreasing values.
— 10 —	
DISCUSSION	
The acceleration values contoured on this map are for the random horizontal component of acceleration. For design purposes, the reference site condition for the map is to be taken as Site Class B.	
The two areas shown as zone boundaries are the projection to the earth's surface of horizontal rupture planes at 9 km depth. Spectral accelerations are constant within the boundaries of the zones. The number on the boundary and inside the zone is the median spectral response acceleration times 1.5.	
Leyendecker, Frankel, and Rukstales (2001, 2004) have prepared a CD-ROM that contains software to allow determination of Site Class B map values by latitude-longitude. The software on the CD contains site coefficients that allow the user to adjust map values for different Site Classes. Additional maps at different scales are also included on the CD. The CD was prepared using the same data as that used to prepare the Maximum Considered Earthquake Ground Motion maps.	
The National Seismic Hazard Mapping Project Web Site, http://eqhazmaps.usgs.gov , contains electronic versions of this map and others. Documentation, gridded values, and Arc/INFO coverages used to make the maps are also available.	
Map prepared by U.S. Geological Survey.	



REFERENCES

Building Seismic Safety Council 2004, NEHRP Recommended Provisions for Seismic Regulations for New Buildings and other Structures, Part 1 - Provisions, FEMA 450.

Building Seismic Safety Council 2004, NEHRP Recommended Provisions for Seismic Regulations for New Buildings and other Structures, Part 2 - Commentary, FEMA 450.

Klein, F., Frankel, A., Mueller, C., Wesson, R. and Okubo, P., 2001, Seismic hazard in Hawaii: high rate of large earthquakes and probabilistic ground-motion maps, Bull. Seism. Soc. Am., v. 91, pp. 479-498.

Klein, F., Frankel, A., Mueller, C., Wesson, R. and Okubo, P., 1998, Seismic-Hazard Maps for Hawaii, Sheet 2 - 2% Probability of Exceedance in 50 Years for Peak Horizontal Acceleration and Horizontal Spectral Response Acceleration for 0.2, 0.3, and 1.0 Second Periods U.S. Geological Survey Geologic Investigation Series I-2724, scale 1:2,000,000.

Leyendecker, E., Frankel, A., and Rukstales, K., 2001, Seismic Design Parameters, U.S. Geological Survey Open-File Report 01-437.

Leyendecker, E., Frankel, A., and Rukstales, K., 2004, Seismic Design Parameters, U.S. Geological Survey Open-File Report (in progress).

National Seismic Hazard Mapping Project Web Site, <http://eqhazmaps.usgs.gov>, U. S. Geological Survey.

FIGURE 3.3-11 MAXIMUM CONSIDERED EARTHQUAKE GROUND MOTION FOR ALASKA OF 0.2 SEC SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B

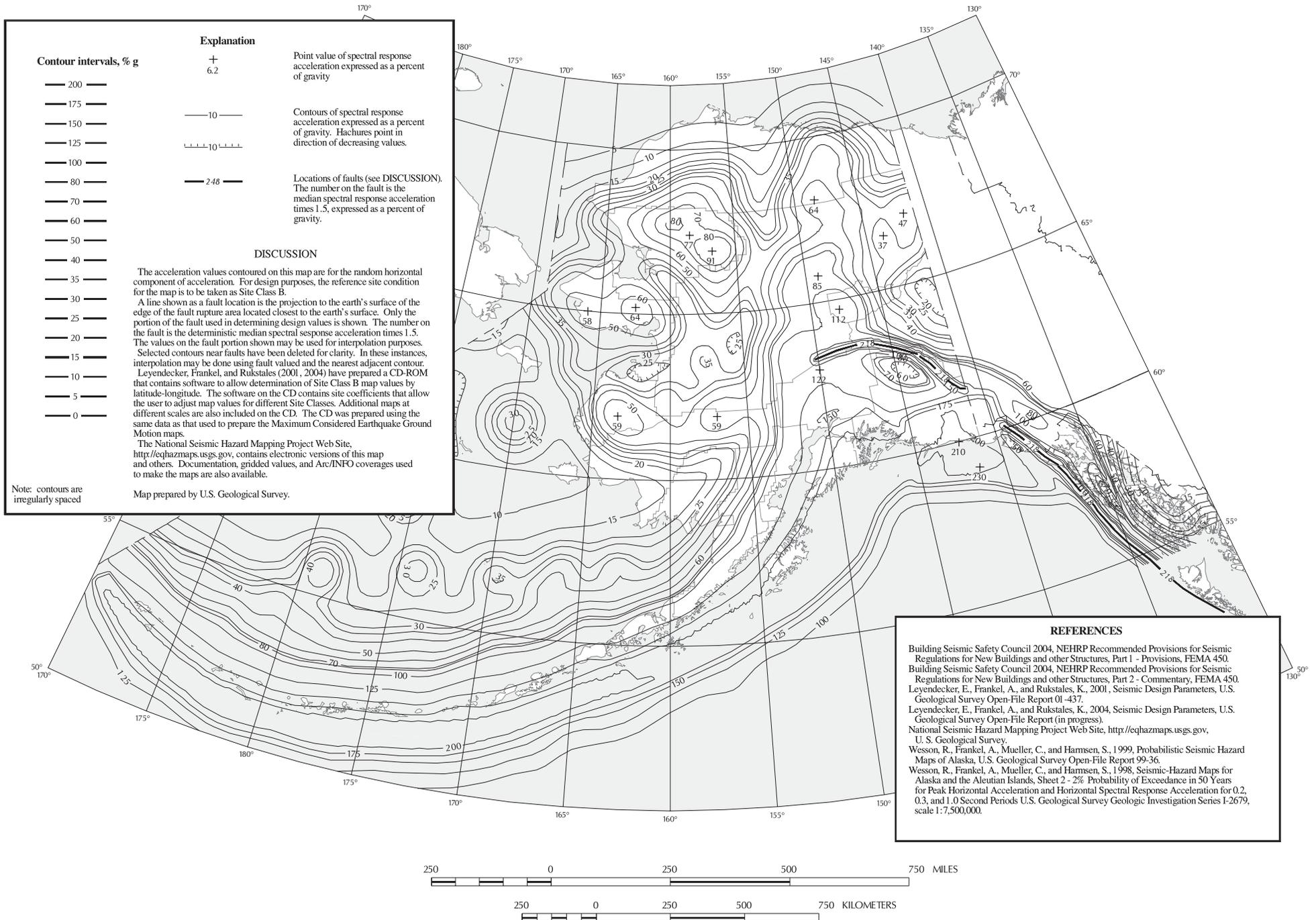


FIGURE 3.3-12 MAXIMUM CONSIDERED EARTHQUAKE GROUND MOTION FOR ALASKA OF 1.0 SEC SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B

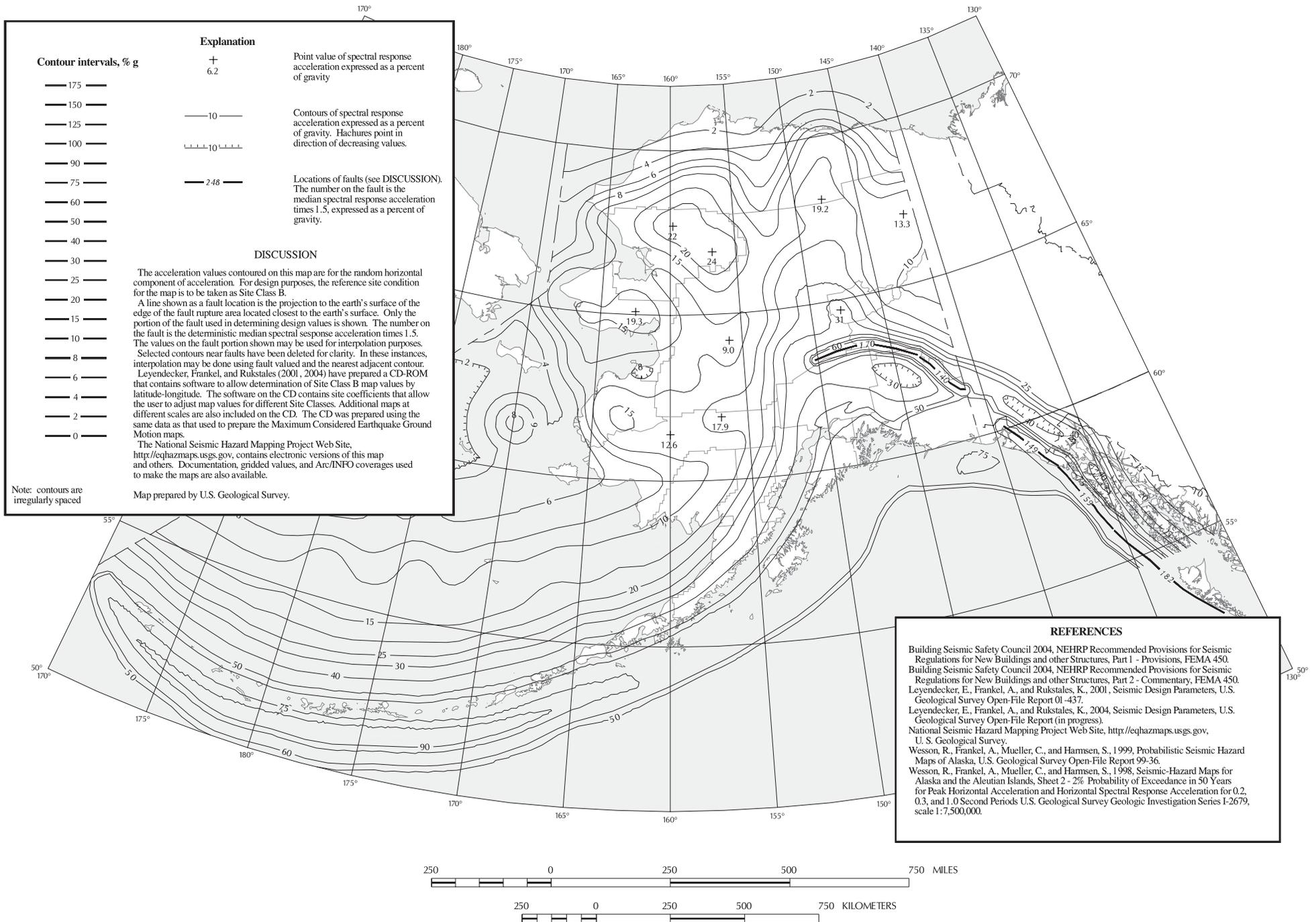
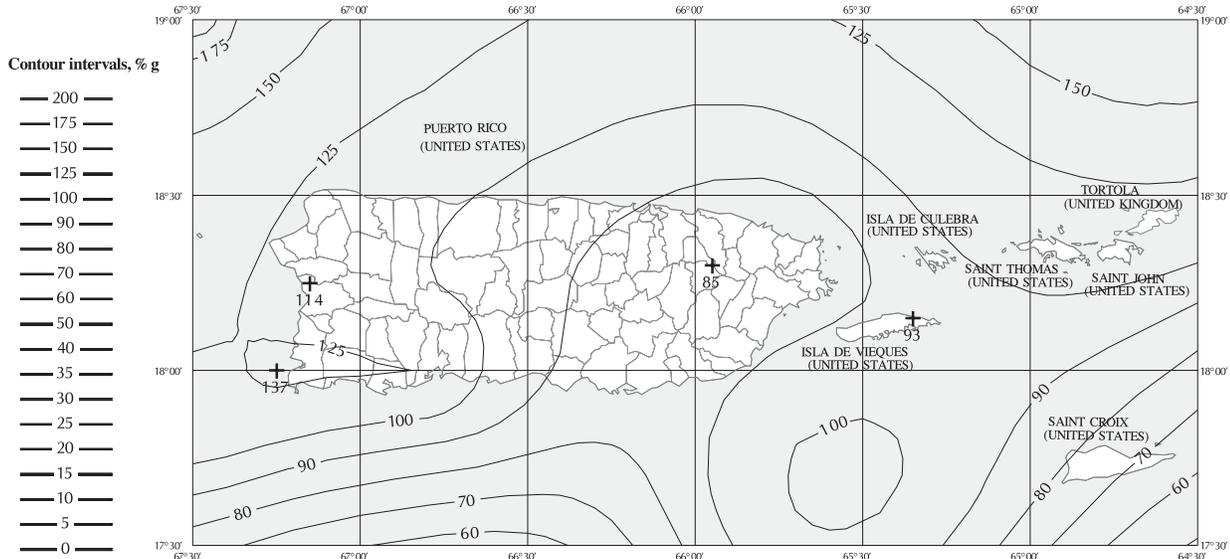
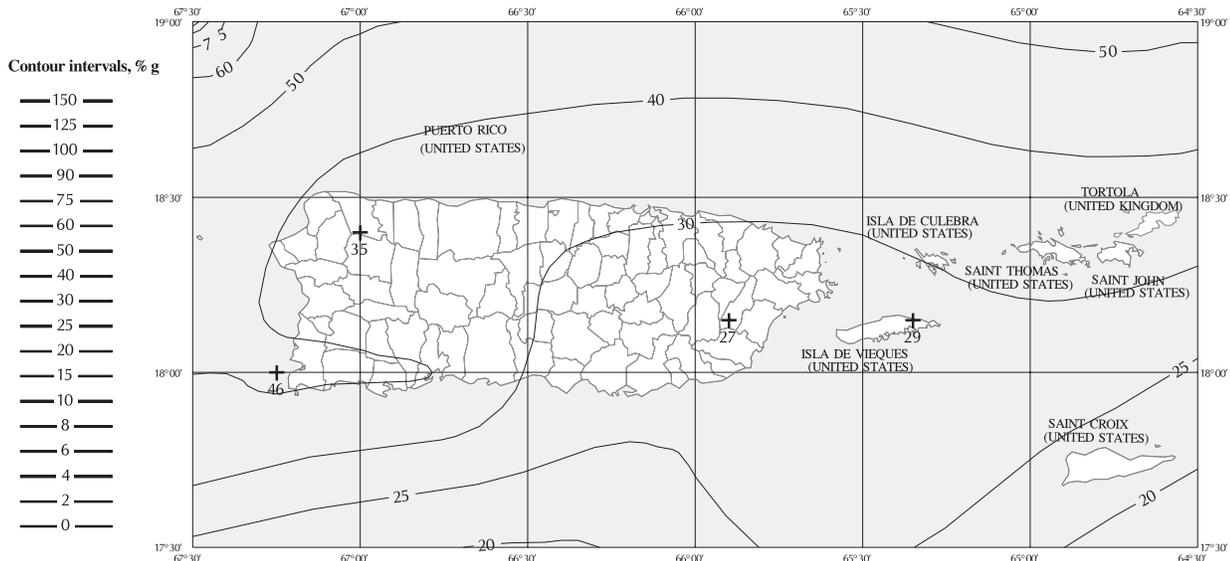


FIGURE 3.3-13 MAXIMUM CONSIDERED EARTHQUAKE GROUND MOTION FOR PUERTO RICO, CULEBRA, VIEQUES, ST. THOMAS, ST. JOHN, AND ST. CROIX OF 0.2 AND 1.0 SEC SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B



0.2 SEC SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)



1.0 SEC SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)

Explanation	
+ 6.2	Point value of spectral response acceleration expressed as a percent of gravity
— 10 —	Contours of spectral response acceleration expressed as a percent of gravity. Hachures point in direction of decreasing values.
— 10 —	

DISCUSSION

The acceleration values contoured on this map are for the random horizontal component of acceleration. For design purposes, the reference site condition for the map is to be taken as Site Class B.

Leyendecker, Frankel, and Rukstales (2001, 2004) have prepared a CD-ROM that contains software to allow determination of Site Class B map values by latitude-longitude. The software on the CD contains site coefficients that allow the user to adjust map values for different Site Classes. Additional maps at different scales are also included on the CD. The CD was prepared using the same data as that used to prepare the Maximum Considered Earthquake Ground Motion maps.

The National Seismic Hazard Mapping Project Web Site, <http://eqhazmaps.usgs.gov>, contains electronic versions of this map and others. Documentation, gridded values, and Arc/INFO coverages used to make the maps are also available.

Map prepared by U.S. Geological Survey.



REFERENCES

Building Seismic Safety Council 2004, NEHRP Recommended Provisions for Seismic Regulations for New Buildings and other Structures, Part 1 - Provisions, FEMA 450.

Building Seismic Safety Council 2004, NEHRP Recommended Provisions for Seismic Regulations for New Buildings and other Structures, Part 2 - Commentary, FEMA 450.

Leyendecker, E., Frankel, A., and Rukstales, K., 2001, Seismic Design Parameters, U.S. Geological Survey Open-File Report 01-437.

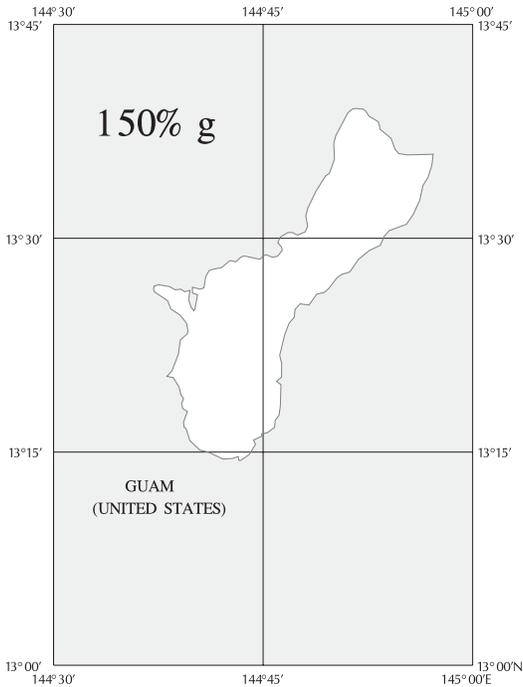
Leyendecker, E., Frankel, A., and Rukstales, K., 2004, Seismic Design Parameters, U.S. Geological Survey Open-File Report (in progress).

Mueller, C., Frankel, A., Petersen, M., and Leyendecker, E., 2003, Documentation for 2003 USGS Seismic Hazard Maps for Puerto Rico and the U.S. Virgin Islands, U.S. Geological Survey Open-File Report 03-379.

Mueller, C., Frankel, A., Petersen, M., and Leyendecker, E., 2004, Seismic-Hazard Maps for Puerto Rico and the U.S. Virgin Islands, Sheet 2 - 2% Probability of Exceedance in 50 Years for Peak Horizontal Acceleration and Horizontal Spectral Response Acceleration for 0.2, 0.3, and 1.0 Second Periods U.S. Geological Survey Geologic Investigation Series (in progress).

National Seismic Hazard Mapping Project Web Site, <http://eqhazmaps.usgs.gov>, U.S. Geological Survey.

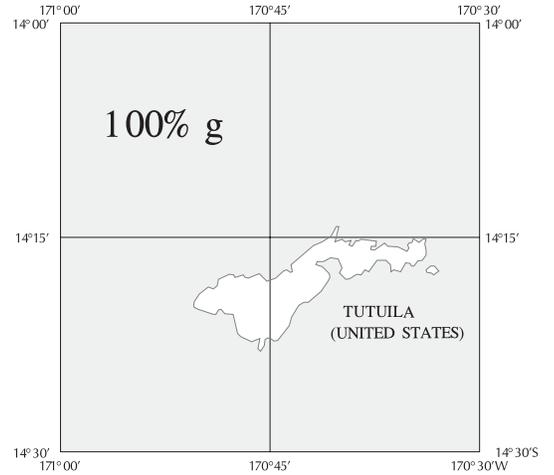
FIGURE 3.3-14 MAXIMUM CONSIDERED EARTHQUAKE GROUND MOTION FOR GUAM AND TUTUILA OF 0.2 AND 1.0 SEC SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING), SITE CLASS B



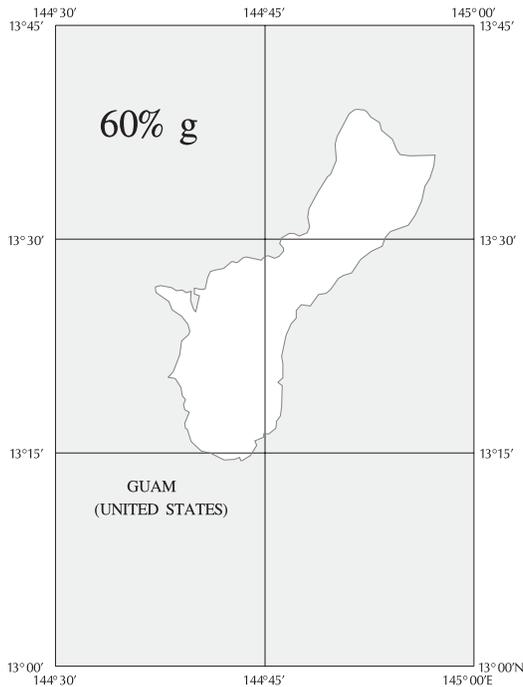
DISCUSSION

Leyendecker, Frankel, and Rukstales (2001, 2004) have prepared a CD-ROM that contains software to allow determination of Site Class B map values by either latitude-longitude or zip code. The software on the CD contains site coefficients that allow the user to adjust map values for different Site Classes.

Map prepared by U.S. Geological Survey.

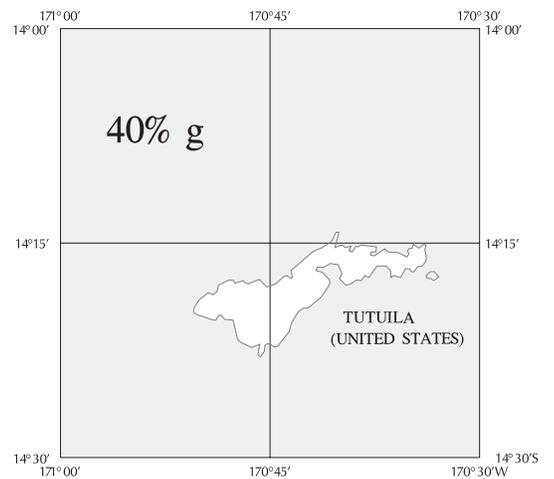


0.2 SEC SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)



REFERENCES

Building Seismic Safety Council 2004, NEHRP Recommended Provisions for Seismic Regulations for New Buildings and other Structures, Part 1 - Provisions, FEMA 450.
 Building Seismic Safety Council 2004, NEHRP Recommended Provisions for Seismic Regulations for New Buildings and other Structures, Part 2 - Commentary, FEMA 450.
 Leyendecker, E., Frankel, A., and Rukstales, K., 2001, Seismic Design Parameters, U.S. Geological Survey Open-File Report 01-437.
 Leyendecker, E., Frankel, A., and Rukstales, K., 2004, Seismic Design Parameters, U.S. Geological Survey Open-File Report (in progress).
 National Seismic Hazard Mapping Project Web Site, <http://eqhazmaps.usgs.gov>, U.S. Geological Survey.



1.0 SEC SPECTRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)



FIGURE 3.3-16 LONG-PERIOD TRANSITION PERIOD, T_L (sec),
FOR THE CONTERMINOUS UNITED STATES

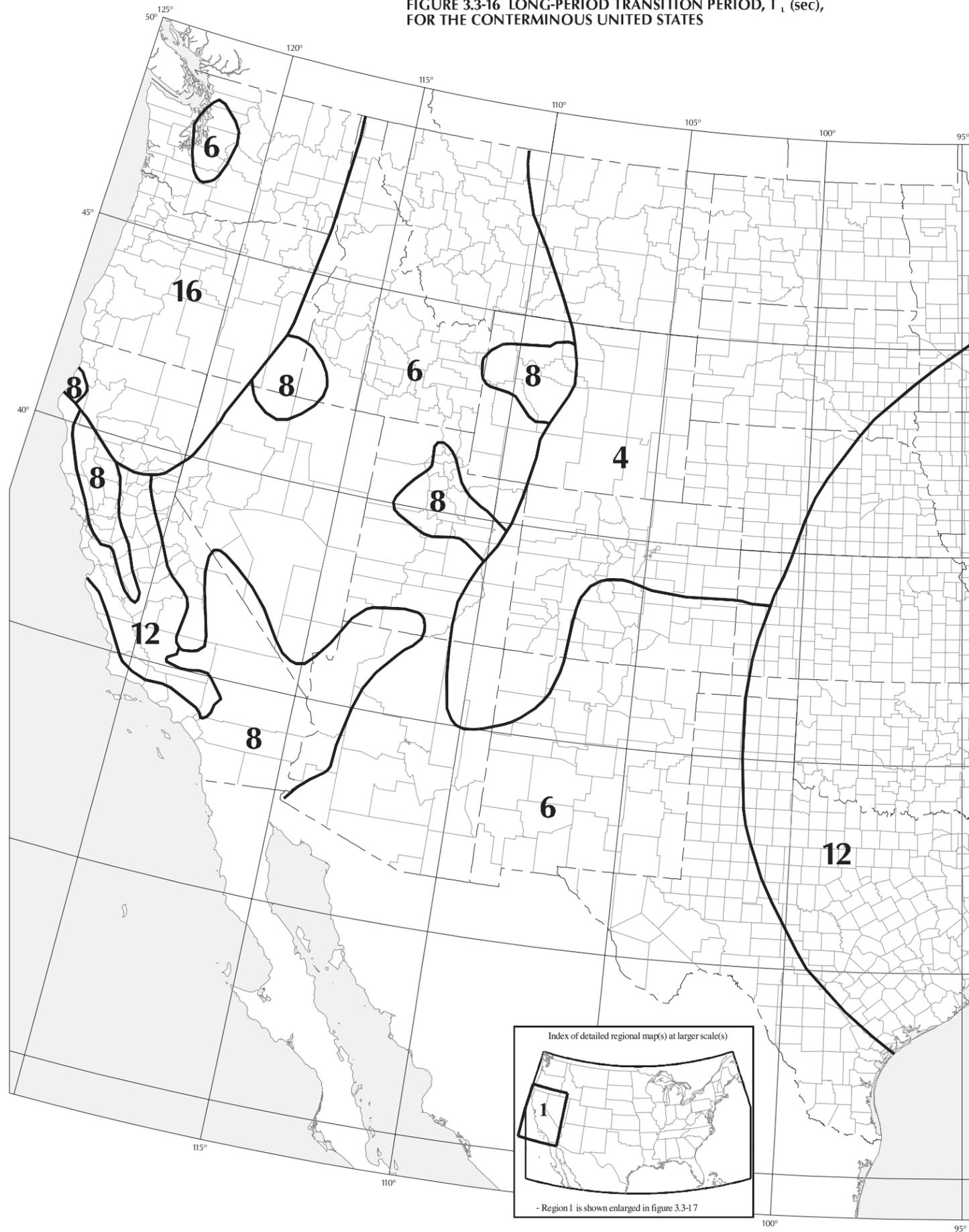


FIGURE 3.3-16 (continued) LONG-PERIOD TRANSITION PERIOD, T_L (sec),
FOR THE CONTERMINOUS UNITED STATES

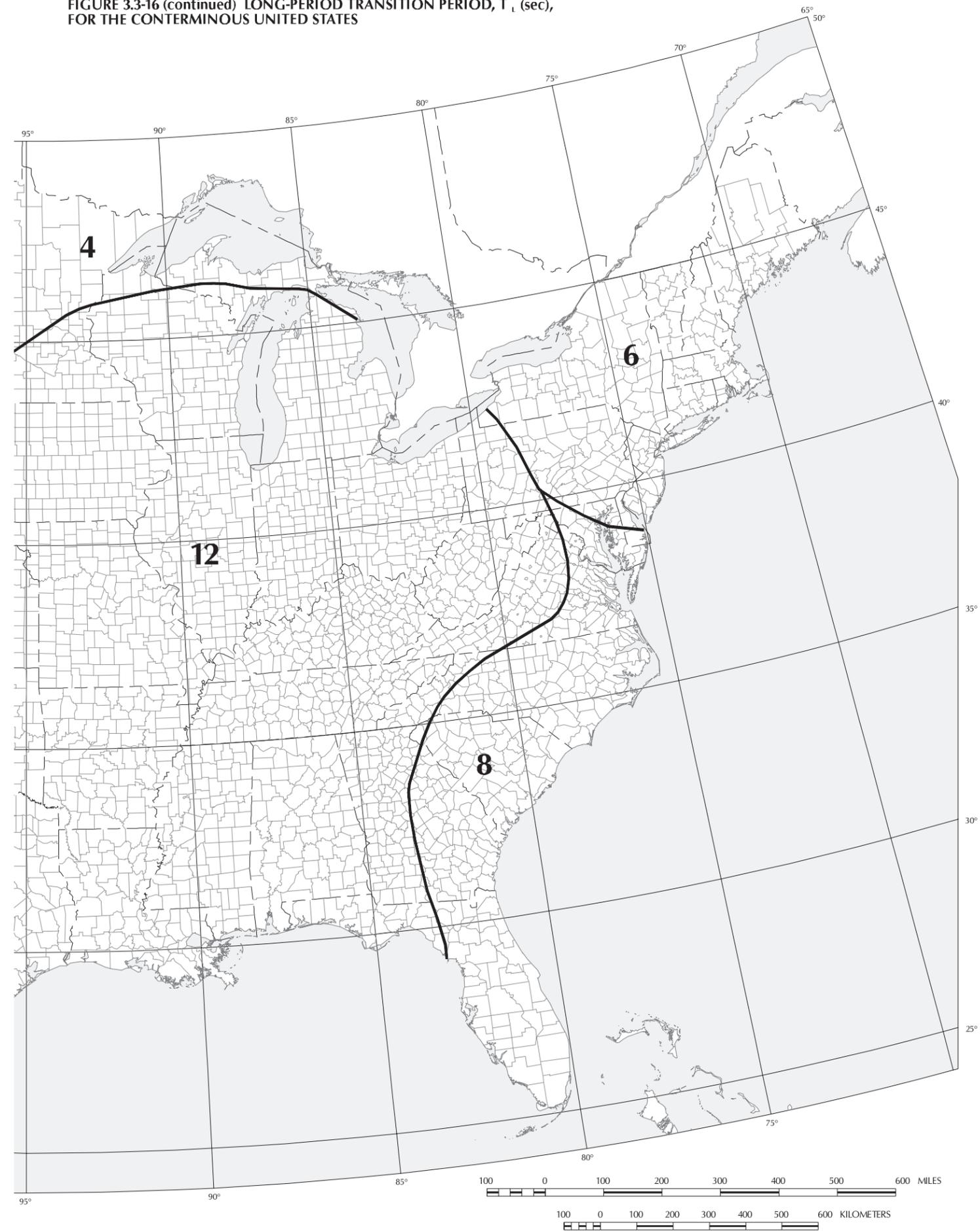


FIGURE 3.3-17 LONG-PERIOD TRANSITION PERIOD, T_L (sec), FOR REGION 1

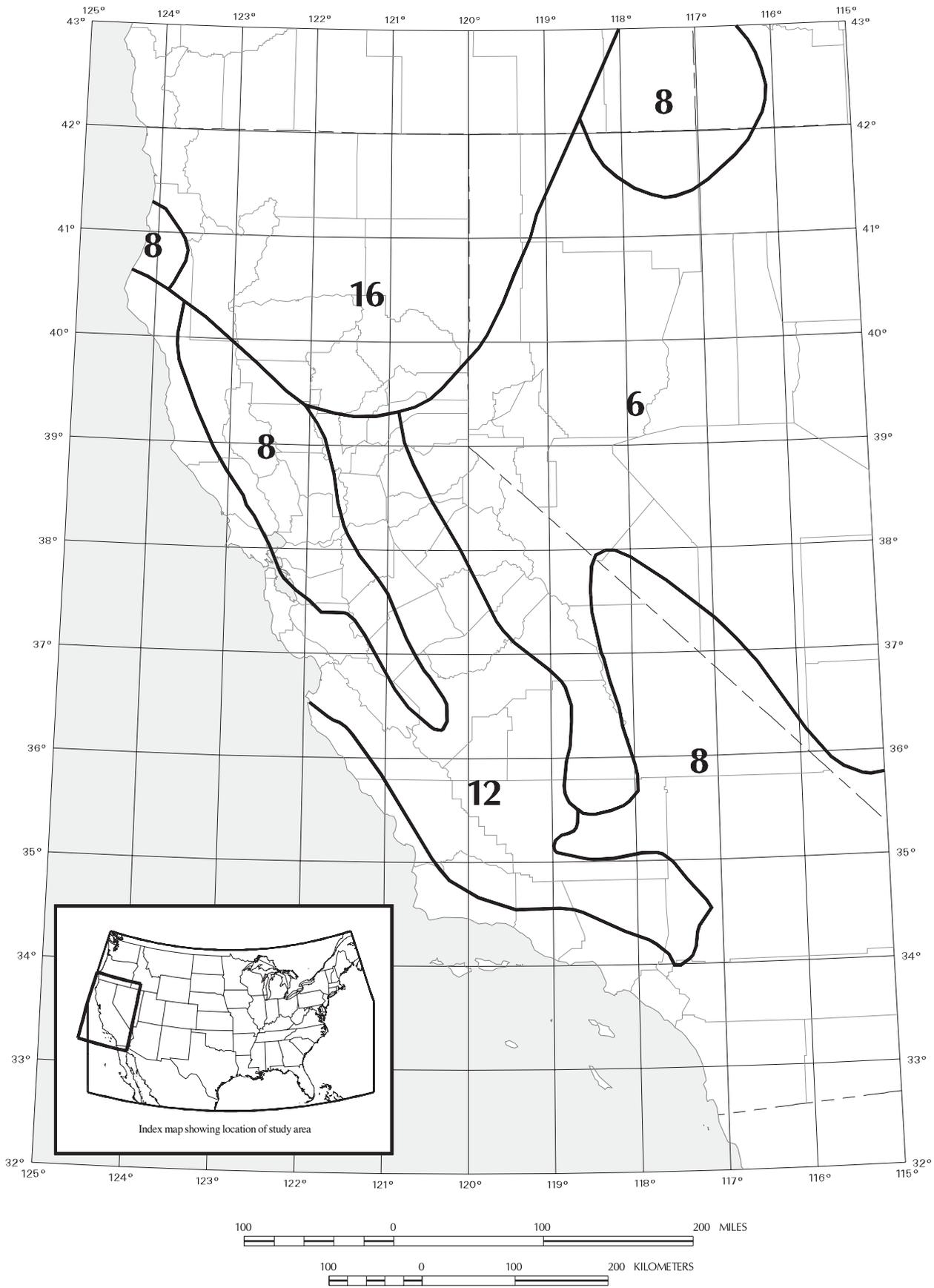


FIGURE 3.3-18 LONG-PERIOD TRANSITION PERIOD, T_L (sec), FOR ALASKA

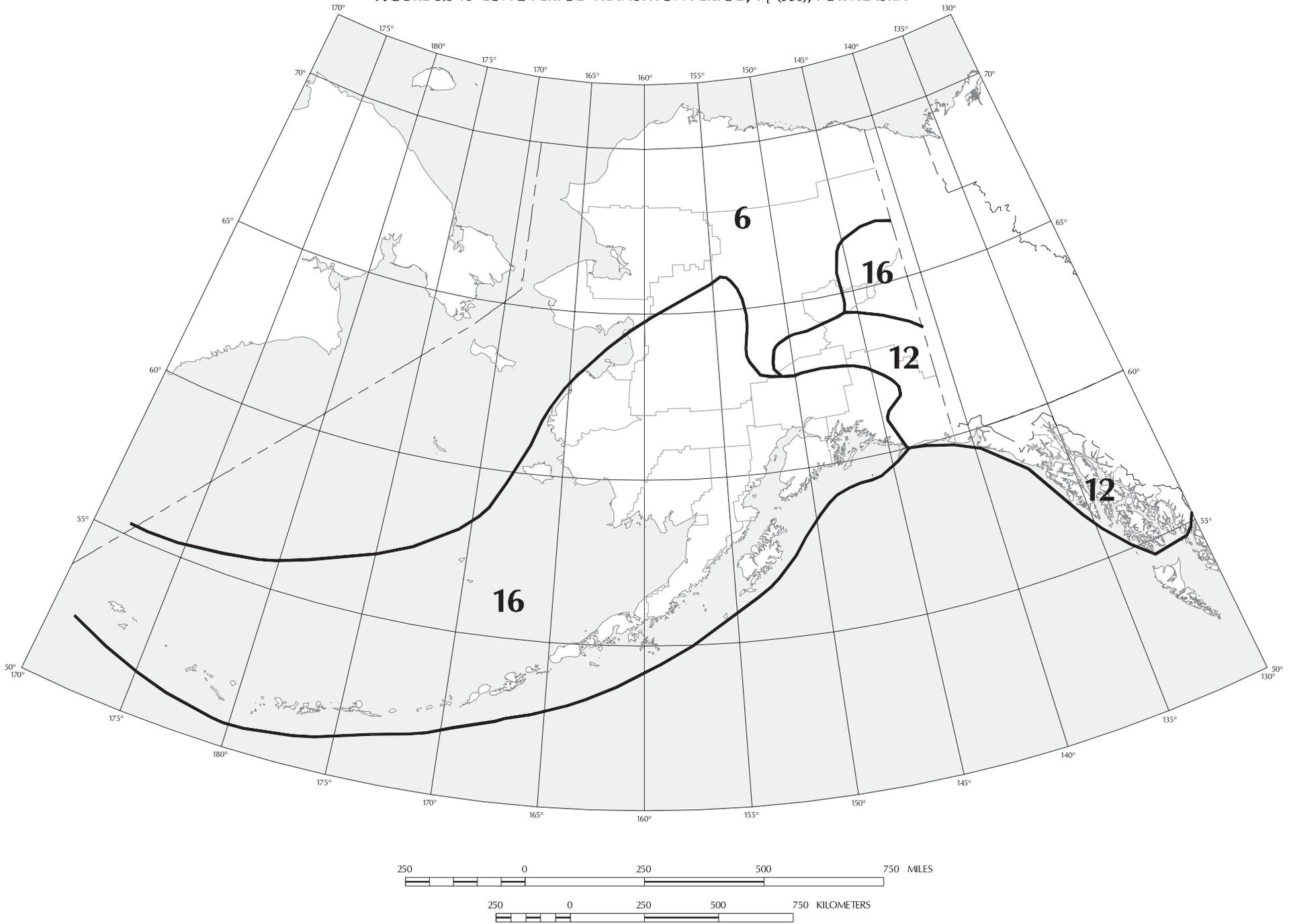
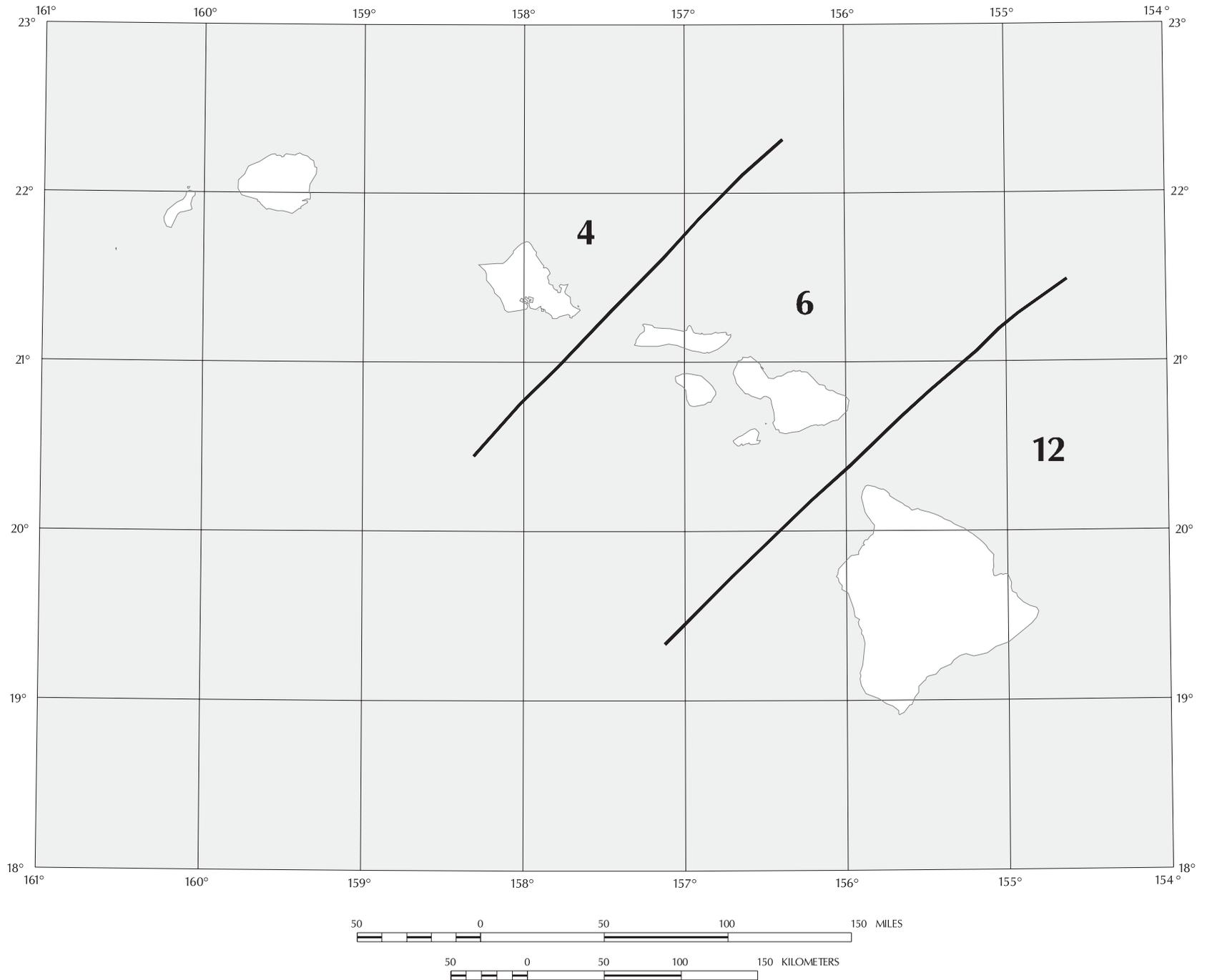
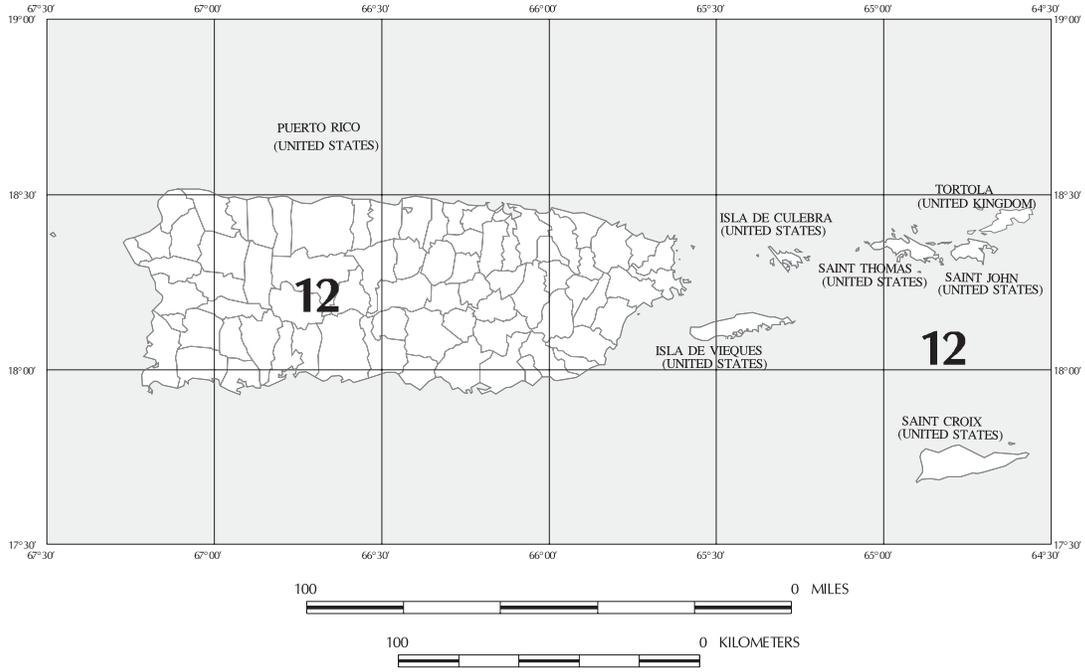


FIGURE 3.3-19 LONG-PERIOD TRANSITION PERIOD, T_L (sec), FOR HAWAII



**FIGURE 3.3-20 LONG-PERIOD TRANSITION PERIOD, T_L (sec), FOR
PUERTO RICO, CULEBRA, VIEQUES, ST. THOMAS, ST. JOHN, AND ST. CROIX**



**FIGURE 3.3-21 LONG-PERIOD TRANSITION PERIOD, T_L (sec),
FOR GUAM AND TUTUILA**

