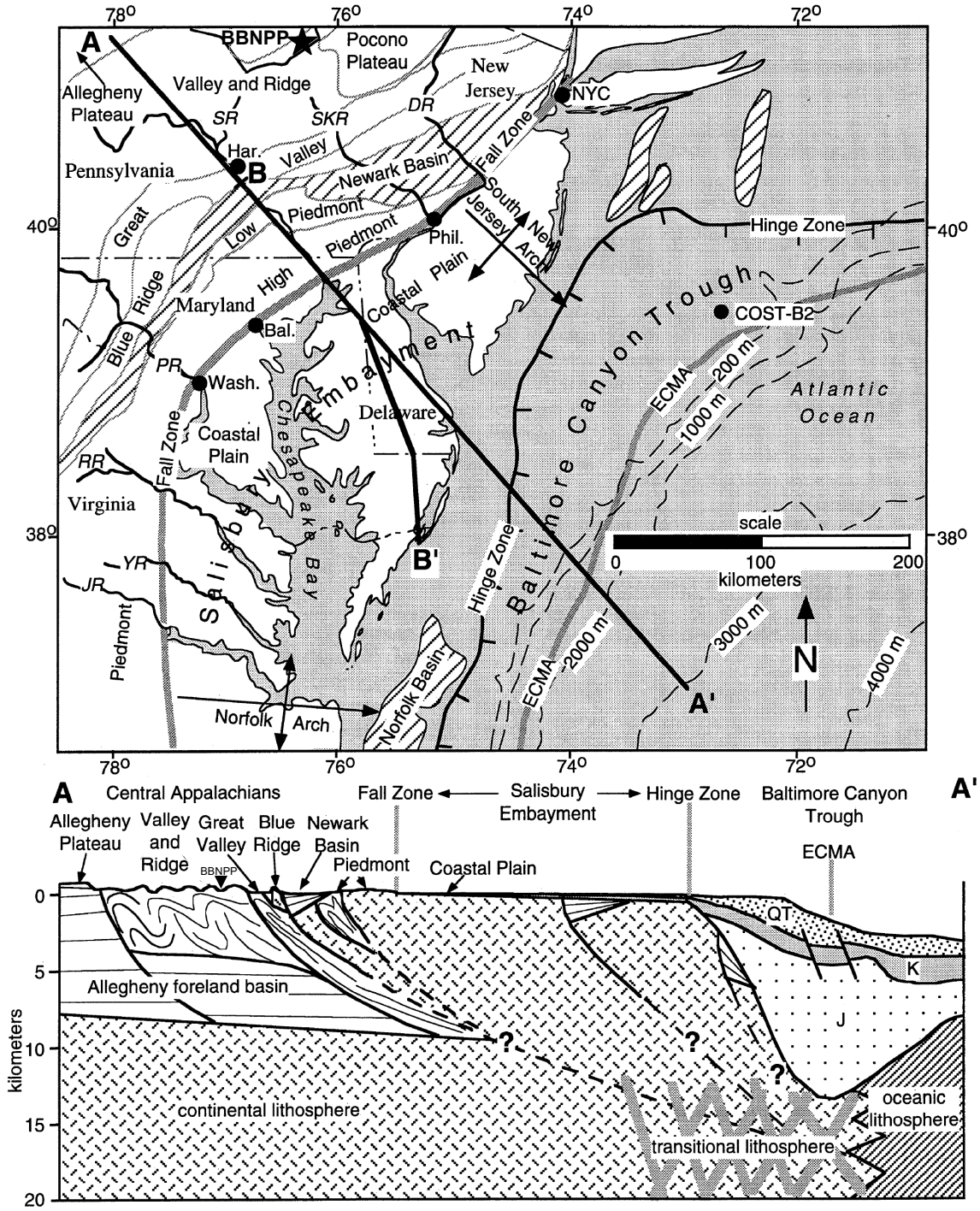
Figure 2.5-7—{Location Map and Cross Section of the Middle U.S. Atlantic Passive Margin}



LEGEND

Syn-rift basins shown with the diagonal-line ruled pattern

DR, Delaware River; **JR**, James River; **PT**, Potomac River; **RR**, Rappahannock River; **SKR**, Schuylkill River; **SR**, Susquehanna River; **YR**, York River; **Bal**, Baltimore; **Har**, Harrisburg; **NYC**, New York City; **Phil**, Philadelphia; **Wash**, Washington

★ **Bell Bend NPP**

BBNPP ▼ Approximate Location of Bell Bend NPP

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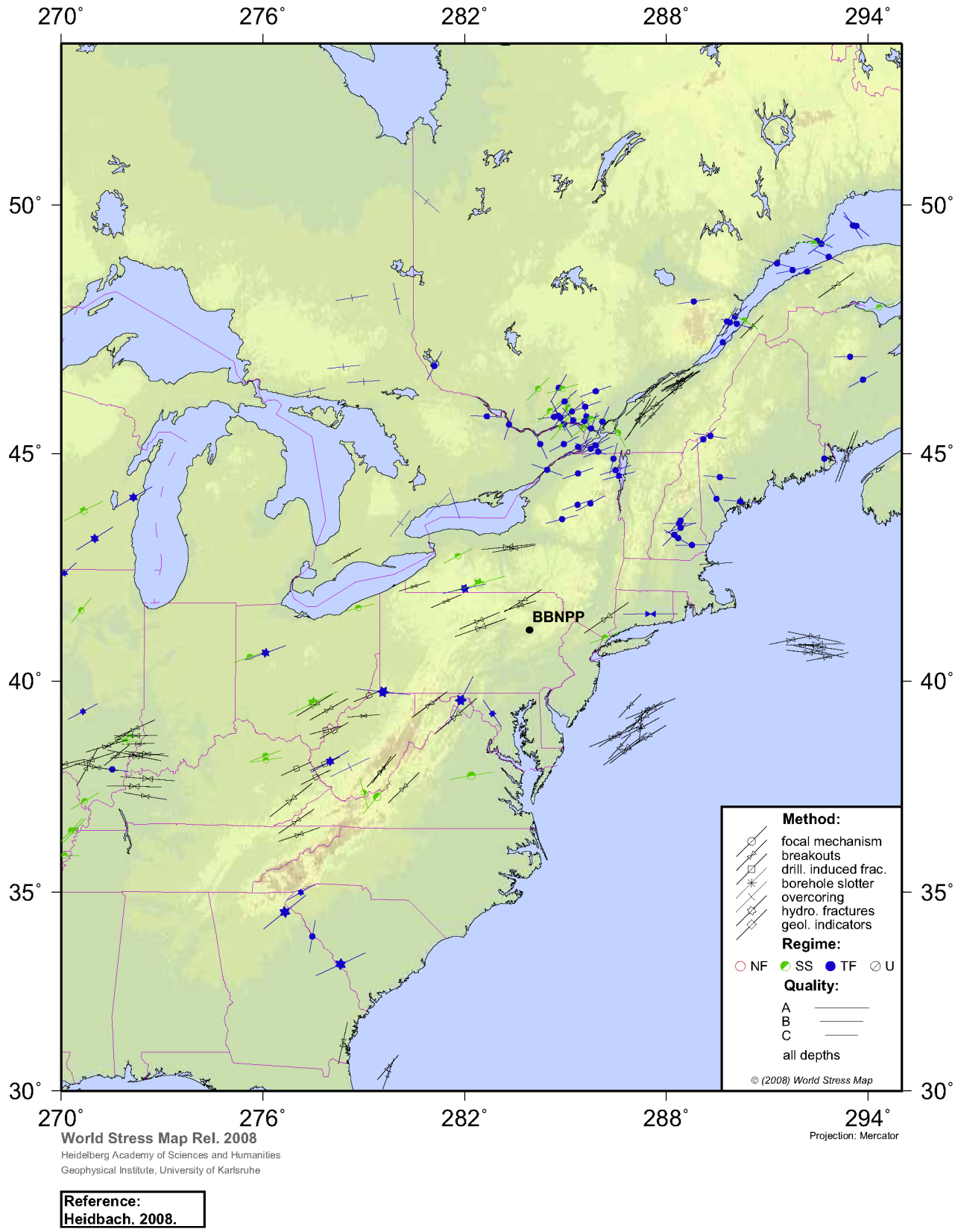
Figure 2.5-8—{Maximum Horizontal Stress Directions in Eastern North America}



Reference:
Heidbach. 2008.

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Figure 2.5-9—{Map Showing the Location of the Appalachian Basin Cross Section}

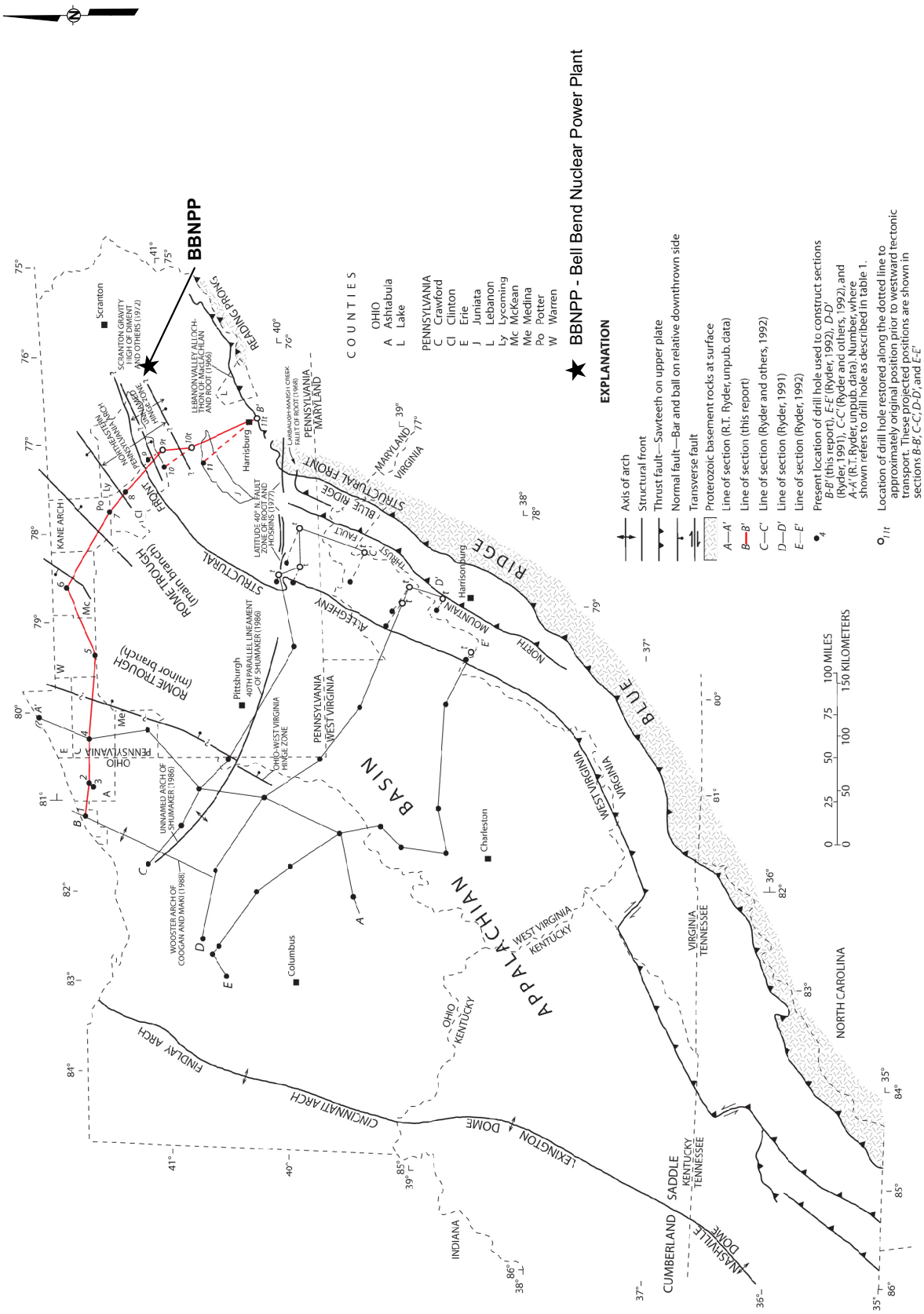

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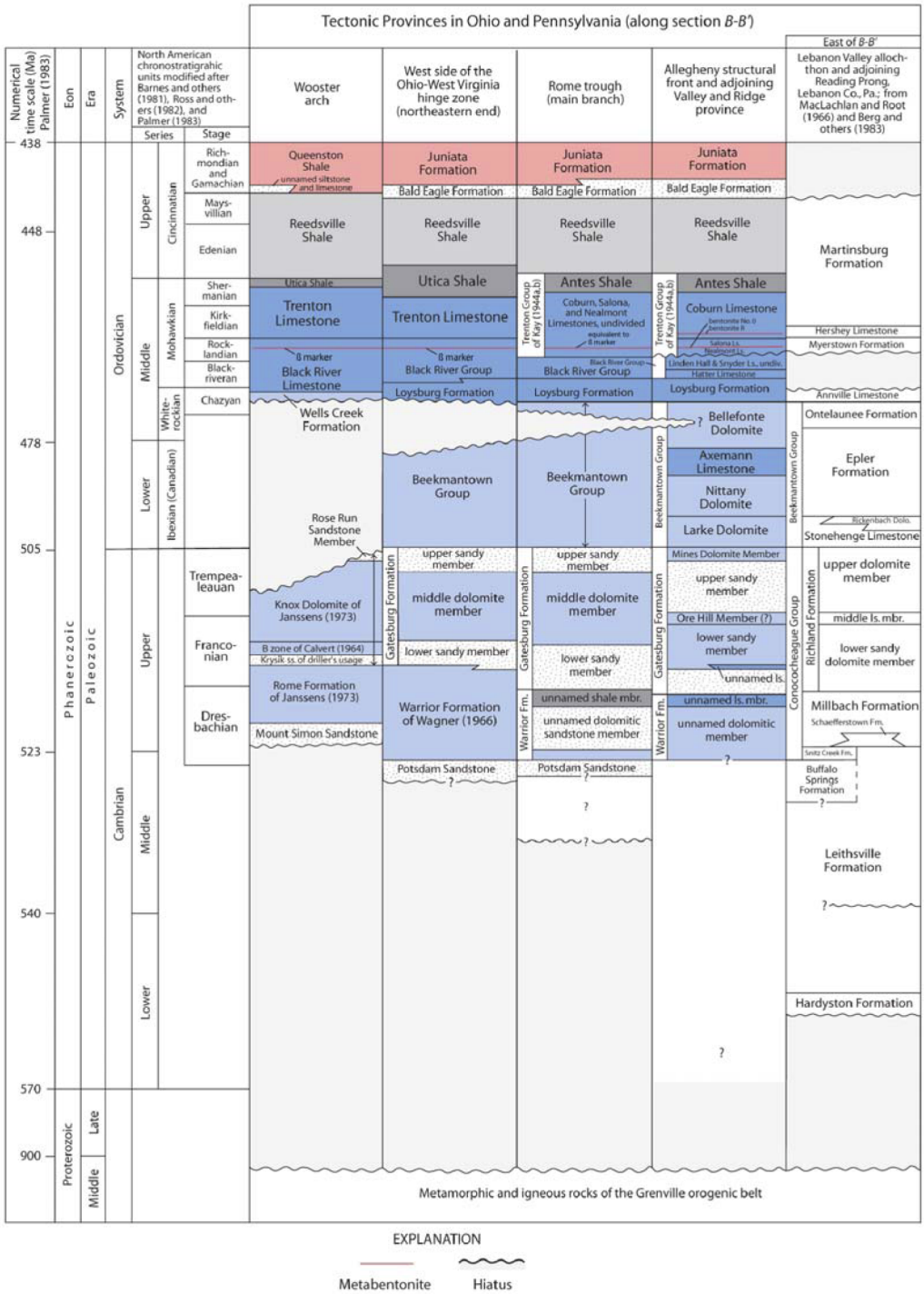
Figure 2.5-10—{Stratigraphic Correlation Chart of Appalachian Basin}



REFERENCE:

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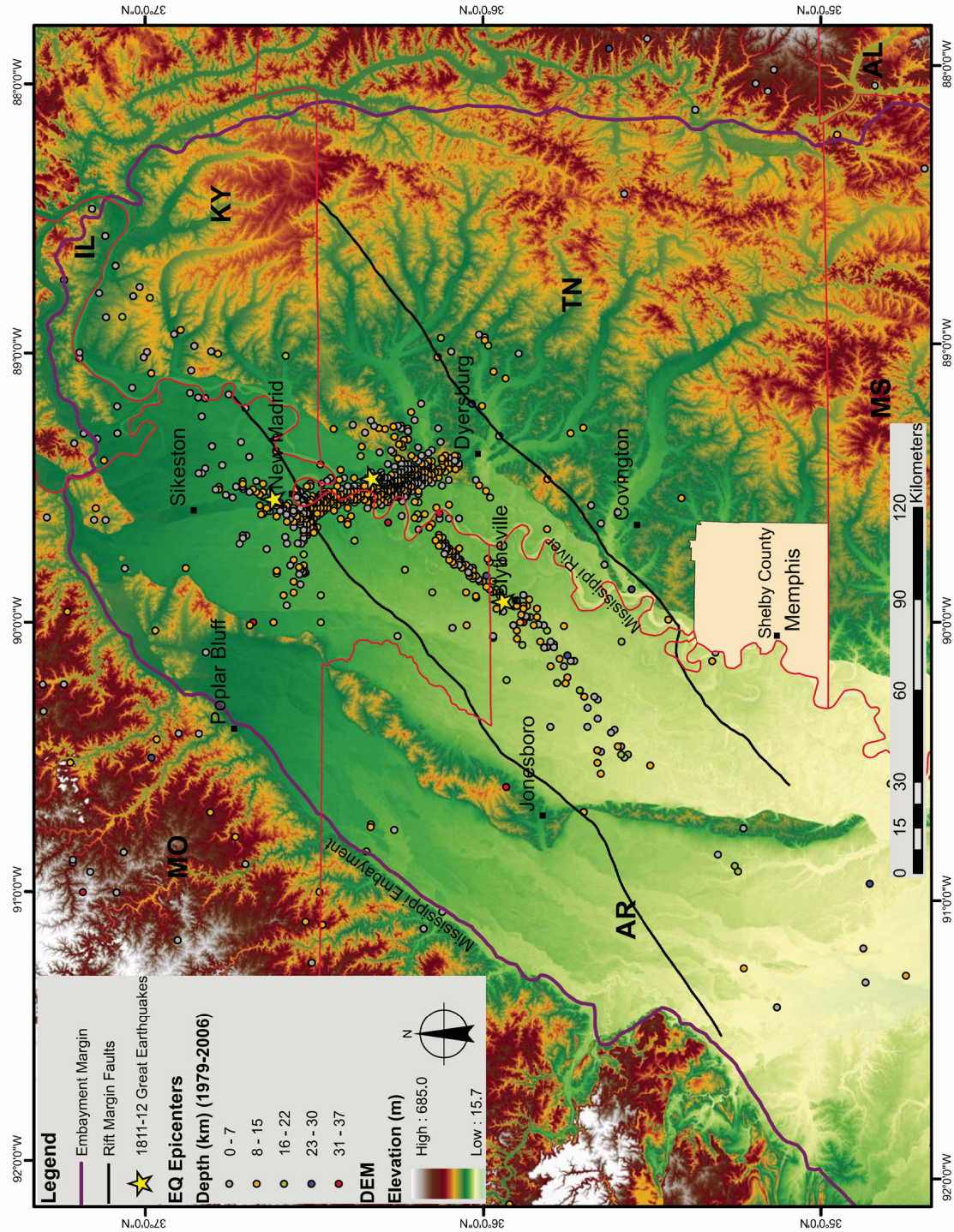

Figure 2.5-11—{New Madrid Seismic Zone with Microearthquake Activity (1979-2006)}

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Figure 2.5-12—{Updated Charleston Seismic Zone (UCSS) Map}

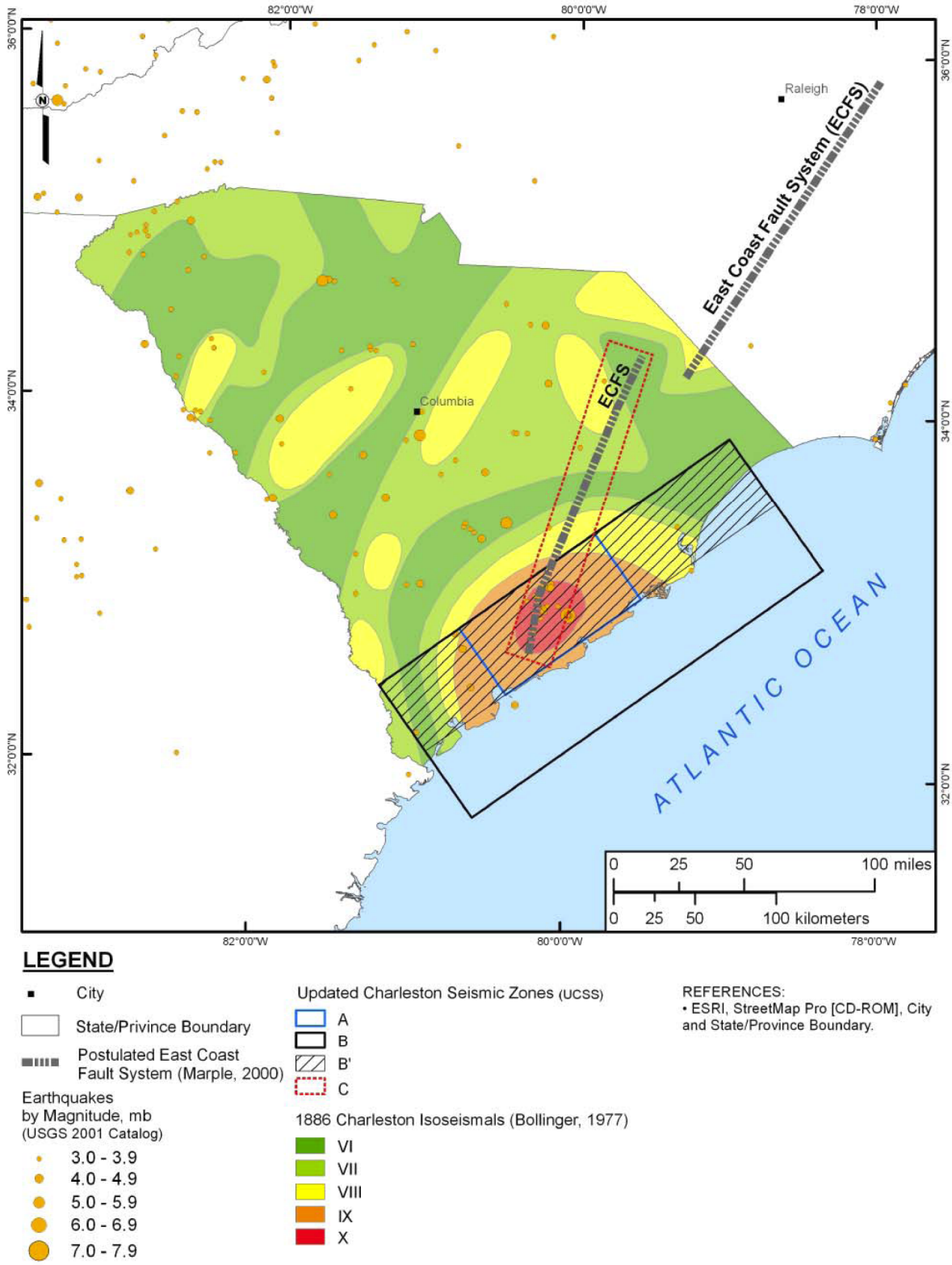

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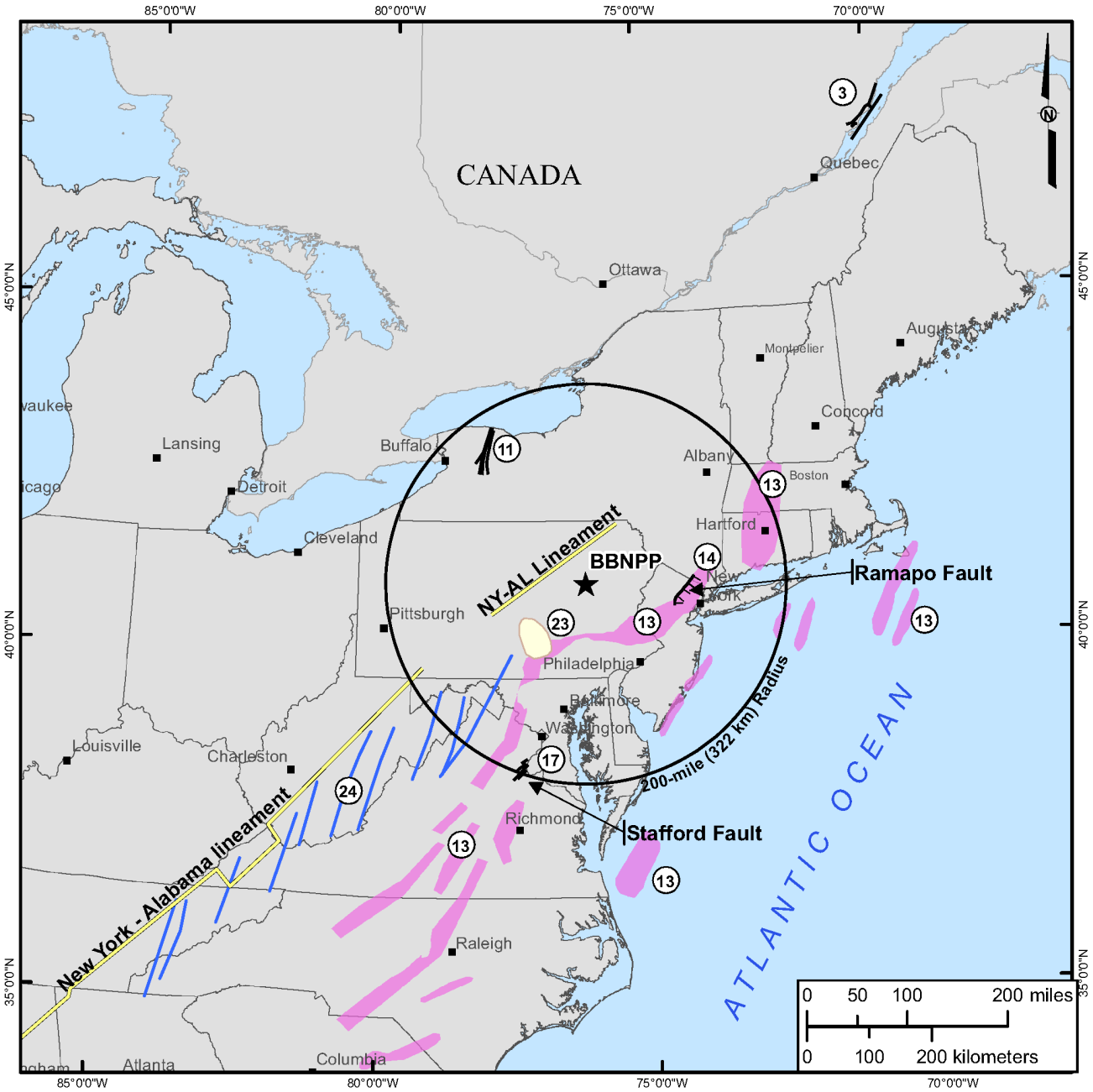
Figure 2.5-13—{Tectonic Interpretations by Bechtel Group}



LEGEND

- ★ Center Point of Proposed Bell Bend NPP (BBNPP)
- ▪ City
- ○ NPP Reactor 200-mile (322 km) Radius
- State/Province Boundary

Bechtel Group
Tectonic Interpretation

- (3) Charlevoix - La Malbaie
- (11) Clarendon - Linden Fault
- (13) Eastern Mesozoic Basins
- (14) Ramapo Fault
- (17) Stafford Fault
- (23) Lebanon - Pennsylvania Geopotential Trend
- (24) Bristol Block Geopotential Trends
- New York - Alabama Lineament

REFERENCES:
- ESRI, 2007.
- EPRI Volume IX: Bechtel Group, 1986.

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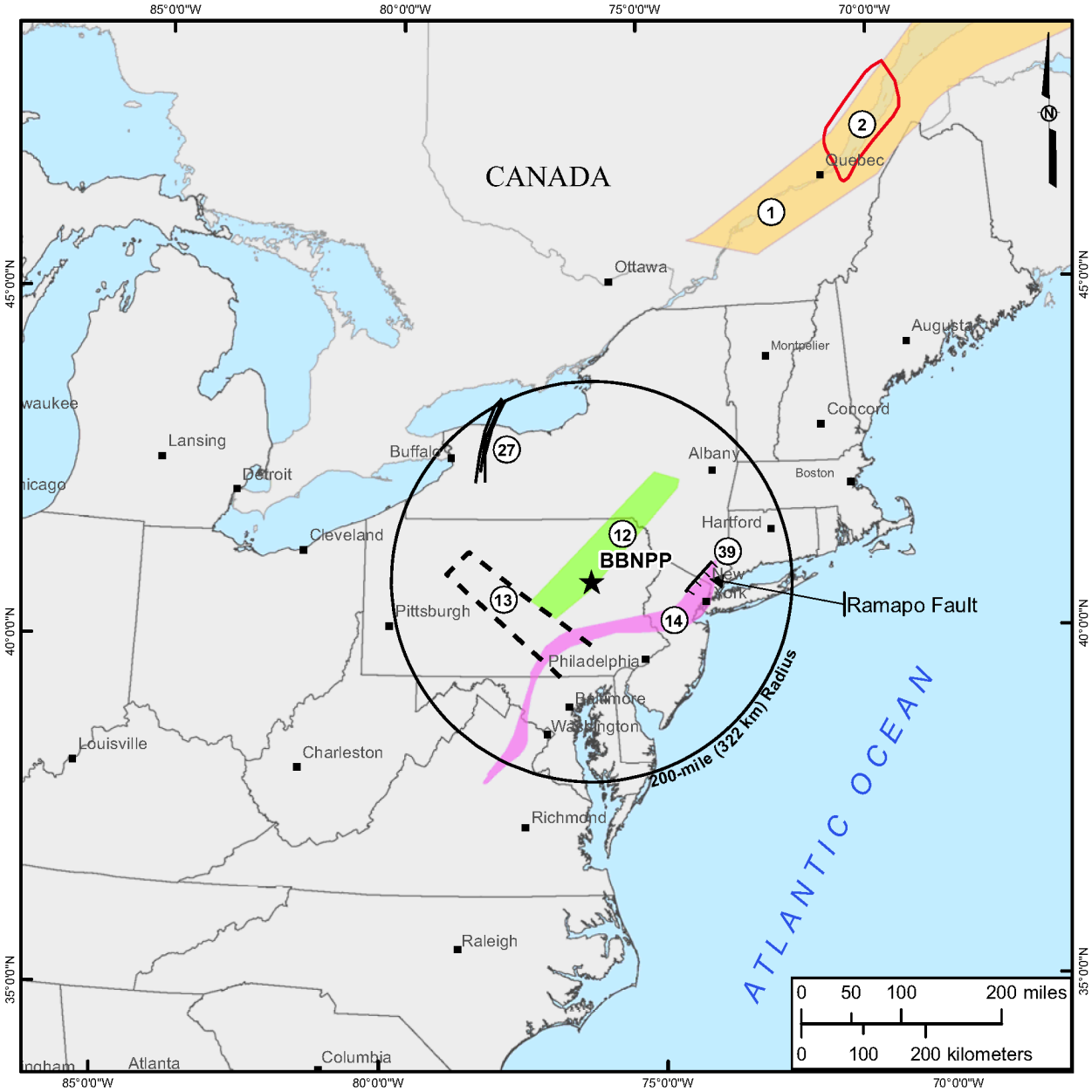
Figure 2.5-14—{Tectonic Interpretations by Dames and Moore}



LEGEND

- ★ Center Point of Proposed Bell Bend NPP (BBNPP)
- ▪ City
- ○ NPP Reactor 200-mile (322 km) Radius
- State/Province Boundary

Dames and Moore Tectonic Interpretation

1. St. Lawrence Valley Rift
2. La Malbaie/Charlevoix Zone
12. Scranton Gravity Anomaly
13. Pennsylvania Aulacogen
14. Newark - Gettysburg Basin
27. Clarendon - Linden Fault Zone
39. Ramapo Fault

REFERENCES:
- ESRI, 2007.
- EPRI Volume VI: Dames and Moore, 1986.

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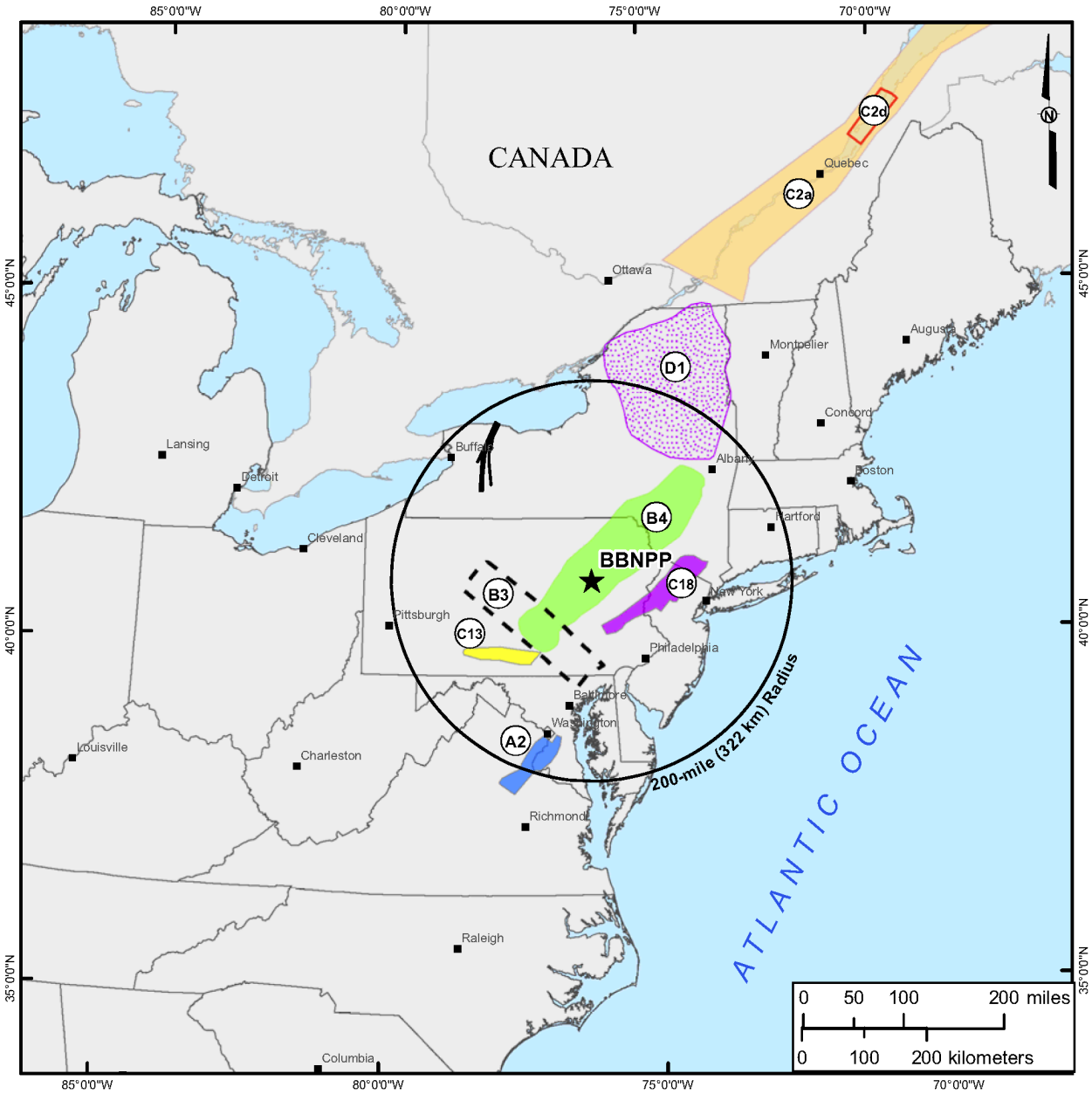
Figure 2.5-15—{Tectonic Interpretations by Law Engineering}



LEGEND

- ★ Center Point of Proposed Bell Bend NPP (BBNPP)
- City
- NPP Reactor 200-mile (322 km) Radius
- State/Province Boundary

Law Engineering Tectonic Interpretation

Regional Features

- B3 Pennsylvania Aulacogen (EOCAMBRIAN RIFTS)
- B4 Scranton Gravity High (EOCAMBRIAN RIFTS)
- C2a St Lawrence Valley Rift (ST. LAWRENCE RIFT SYSTEM)
- C2d Charlevoix - La Malbaie Area (ST. LAWRENCE RIFT SYSTEM)
- D1 Adirondacks (MESOZOIC RIFTS)

Faults and Shear Zones

- A2 Stafford - Brandywine Fault Zone
- C14 Clarendon - Linden Structure
- C13 Latitude 40° N Fault Zone
- C18 Ramapo Fault

REFERENCES:
- ESRI, 2007.
- EPRI Volume VII: Law Engineering, 1986.

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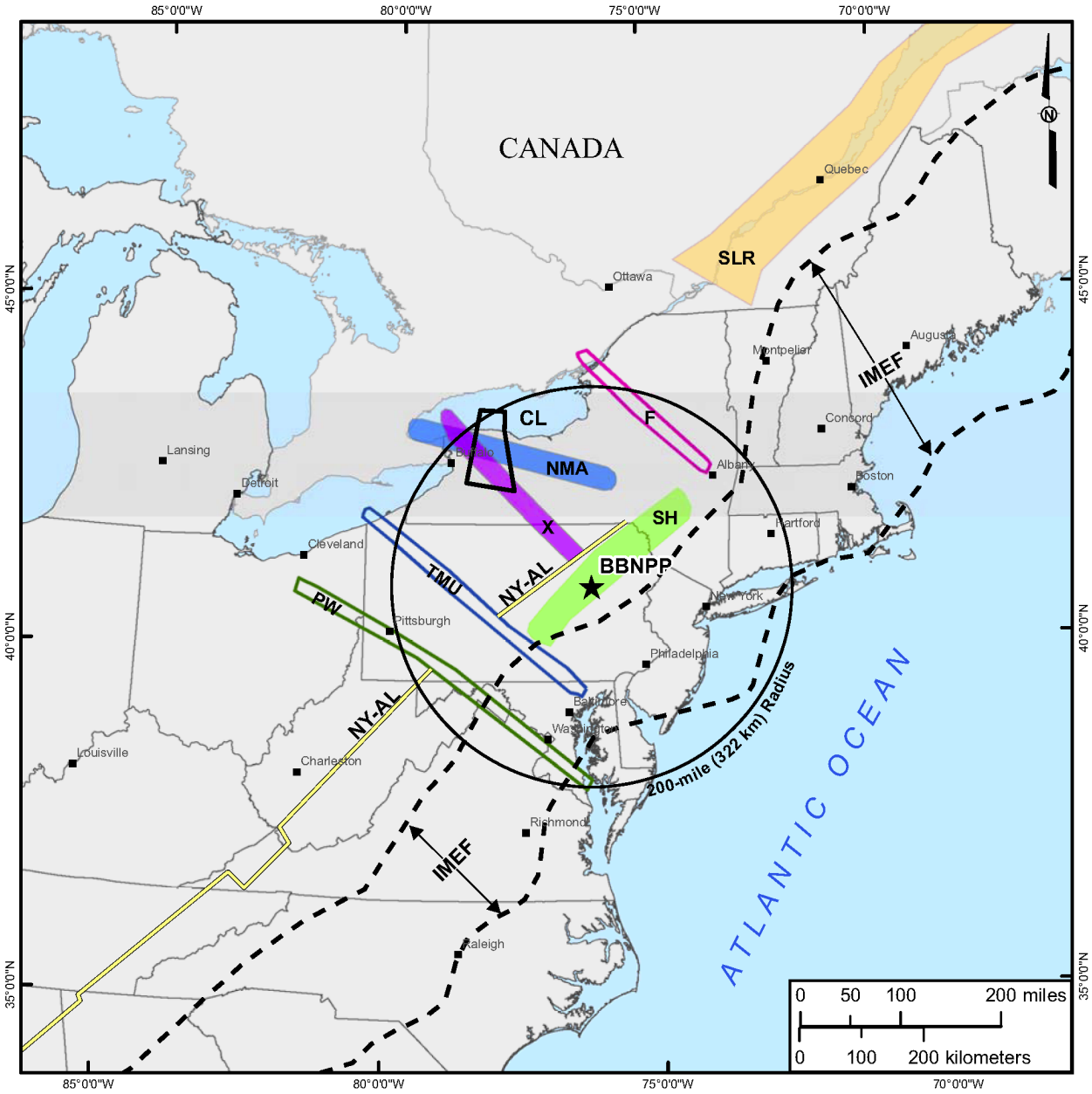
Figure 2.5-16—{Tectonic Interpretations by Rondout Associates}



LEGEND

- ★ Center Point of Proposed Bell Bend NPP (BBNPP)
- ▪ City
- ○ NPP Reactor 200-mile (322 km) Radius
- State/Province Boundary

Rondout Associates Tectonic Interpretations

CL	Clarendon-Linden
F	Gravity Lineament
IMEF	Inboard Mesozoic Extentional Fault Realm
NMA	Niagara Magnetic Anomaly
NY-AL	New York - Alabama Lineament
PW	Pittsburgh - Washington Lineament
SH	Scranton Gravity HIgh
SLR	St. Lawrence Rift
TMU	Tyrone - Mt. Union Lineament
X	Gravity Anomaly

REFERENCES:
- ESRI, 2007.
- EPRI Volume X: Rondout Associates, 1986.

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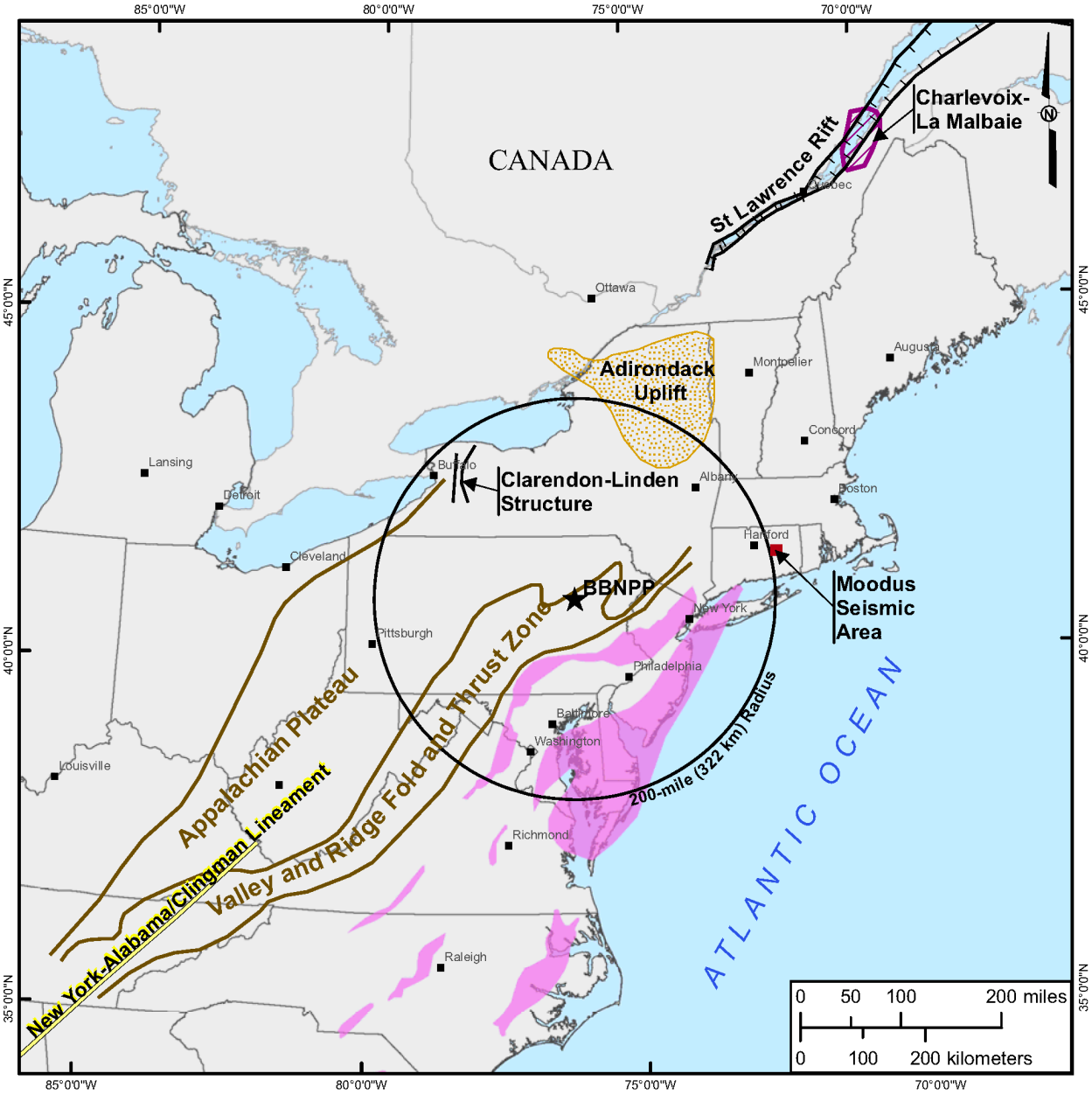
Figure 2.5-17—{Tectonic Interpretation by Weston Geophycial}



LEGEND

- ★ Center Point of Proposed Bell Bend NPP (BBNPP)
- ▪ City
- ○ NPP Reactor 200-mile (322 km) Radius

Weston Geophysical Tectonic Features

- Adirondack Uplift
- Charlevoix - La Malbaie
- Clarendon - Linden Structure
- N.Y. - Alabama/Clingman Lineaments
- St. Lawrence Rift
- Appalachian Plateau
- Valley and Ridge Fold and Thrust Zone
- Moodus Seismic Area
- Zone of Mesozoic Basins

REFERENCES:
- ESRI, 2007.
- EPRI Volume V: Weston Geophysical, 1986.

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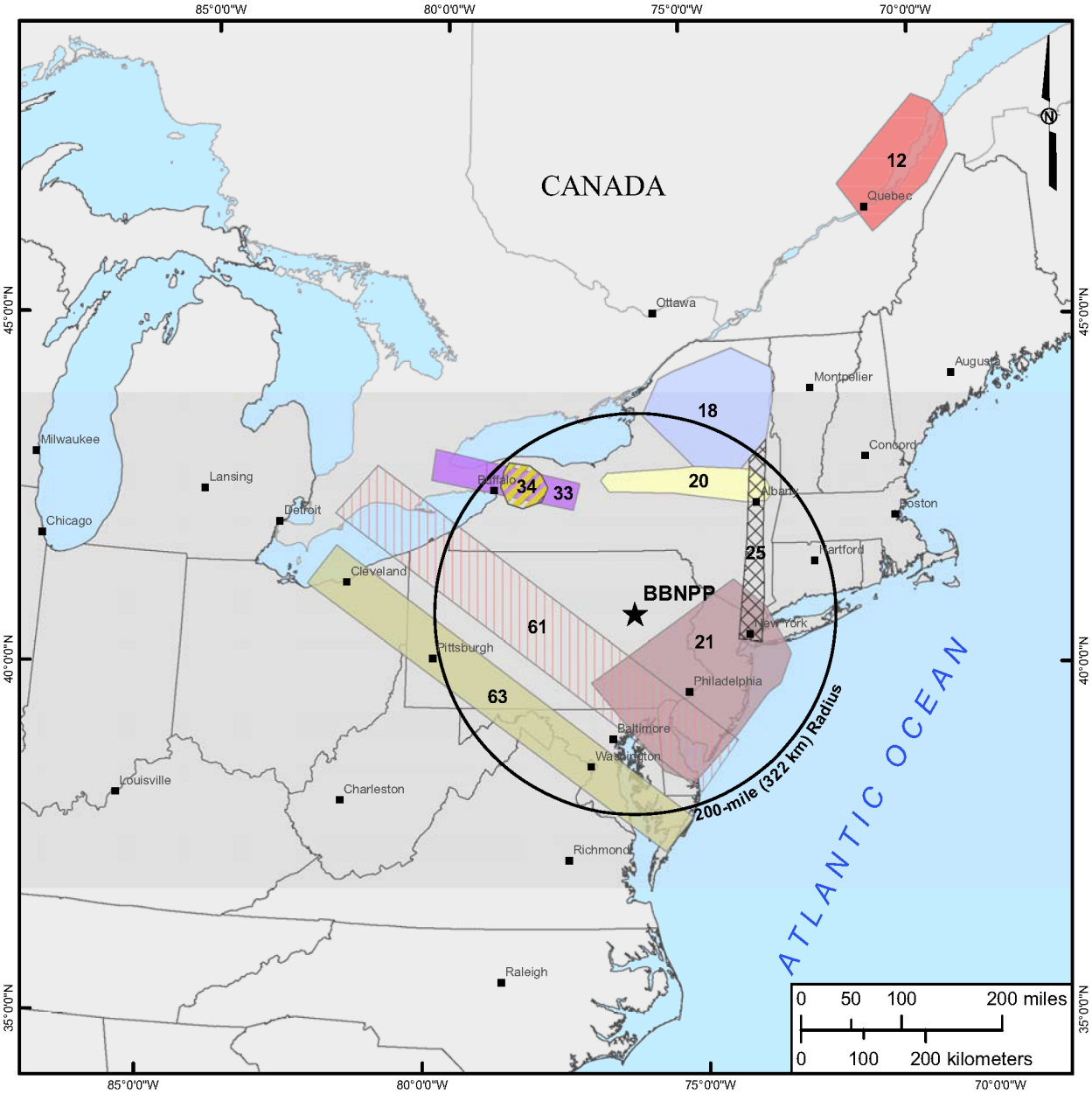
Figure 2.5-18—{Tectonic Interpretations by Woodward-Clyde Consultants}



LEGEND

- ★ Center Point of Proposed Bell Bend NPP (BBNPP)
- ▪ City
- ○ NPP Reactor 200-mile (322 km) Radius

Woodward-Clyde Tectonic Interpretations

18	Adirondack Uplift
20	Mohawk River Trend
21	NJ Isostatic Gravity Saddle
25	Hudson River Valley Trend
33	Western NY - Southern Ontario Trend
34	Attica, NY Intersection Feature
63	Pittsburgh-Washington Lineament
12	Charlevoix - La Malbaie Structure
61	Tyrone - Mt. Union Lineament

REFERENCES:
- ESRI, 2007.
- EPRI Volume VIII: Woodward-Clyde Consultants, 1986.

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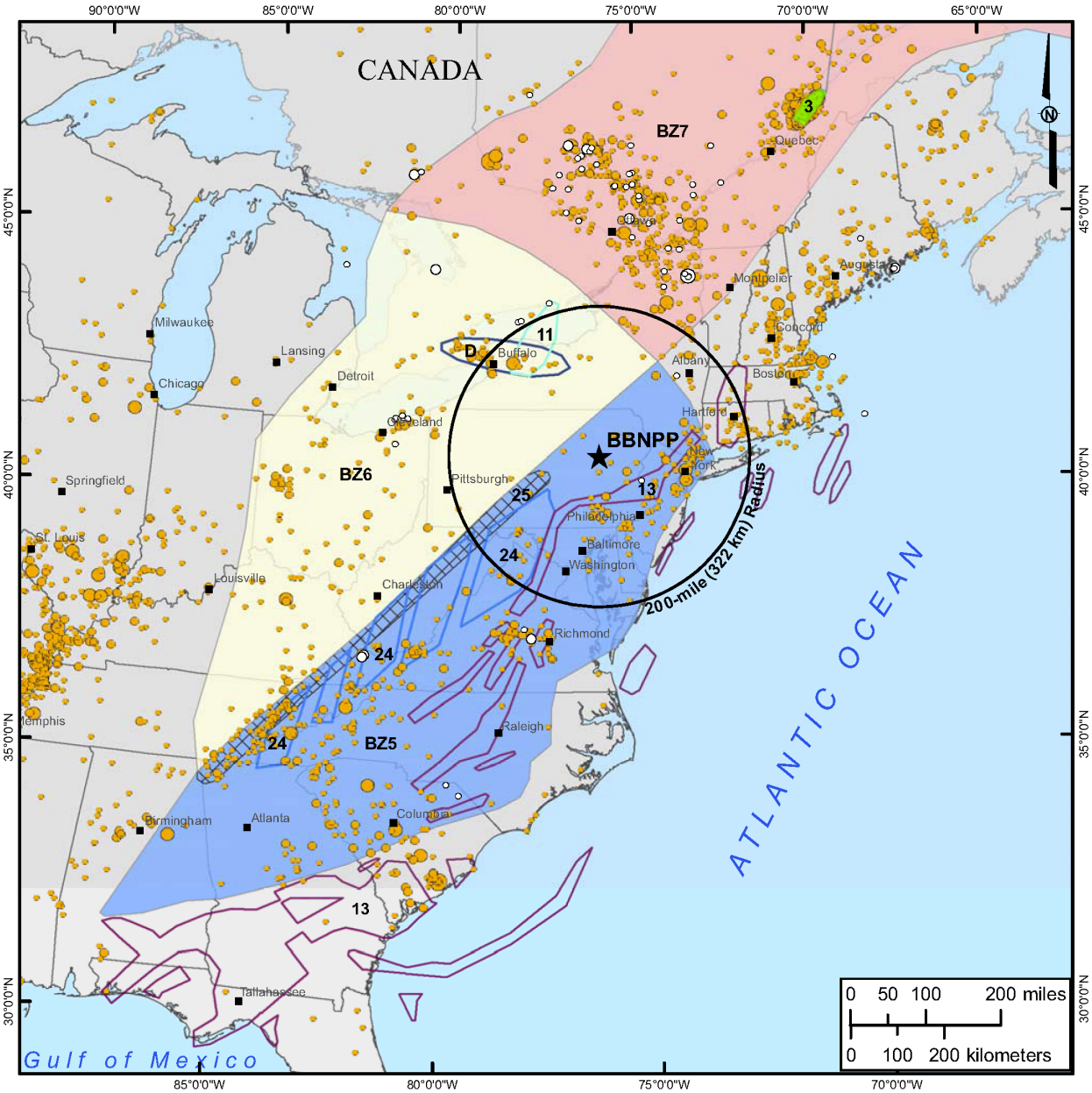
Figure 2.5-19—{Bechtel Group EPRI Source Zones}



LEGEND

★ Center Point of Proposed Bell Bend NPP (BBNPP)

■ City

○ NPP Reactor 200-mile (322 km) Radius

Earthquakes by Magnitude, mb (SEE NOTE)

USGS 2001	USGS 2002 to 2007
3.0 - 3.9	3.0 - 3.9
4.0 - 4.9	4.0 - 4.9
5.0 - 5.9	5.0 - 5.9
6.0 - 6.9	
7.0 - 7.9	

NOTE: The 2002 to 2007 seismicity shown in 500-mile (805 km) radius.

Bechtel Group Sources contributing to 99% of BBNPP Site Hazard

- 3 La Malbaie
- 11 Clarendon-Linden
- 13 Mesozoic Basins
- 24 Bristol Block
- 25 NY-AL Lineament
- BZ5 Southern Appalachians Background
- BZ6 Southern Eastern Craton Background
- BZ7 Northern Eastern Craton Background
- D Niagara Area

REFERENCES:
- ESRI, 2007.
- USGS 2007.
- ANSS, 2007.
- EPRI Volume IX: Bechtel Group, 1986.

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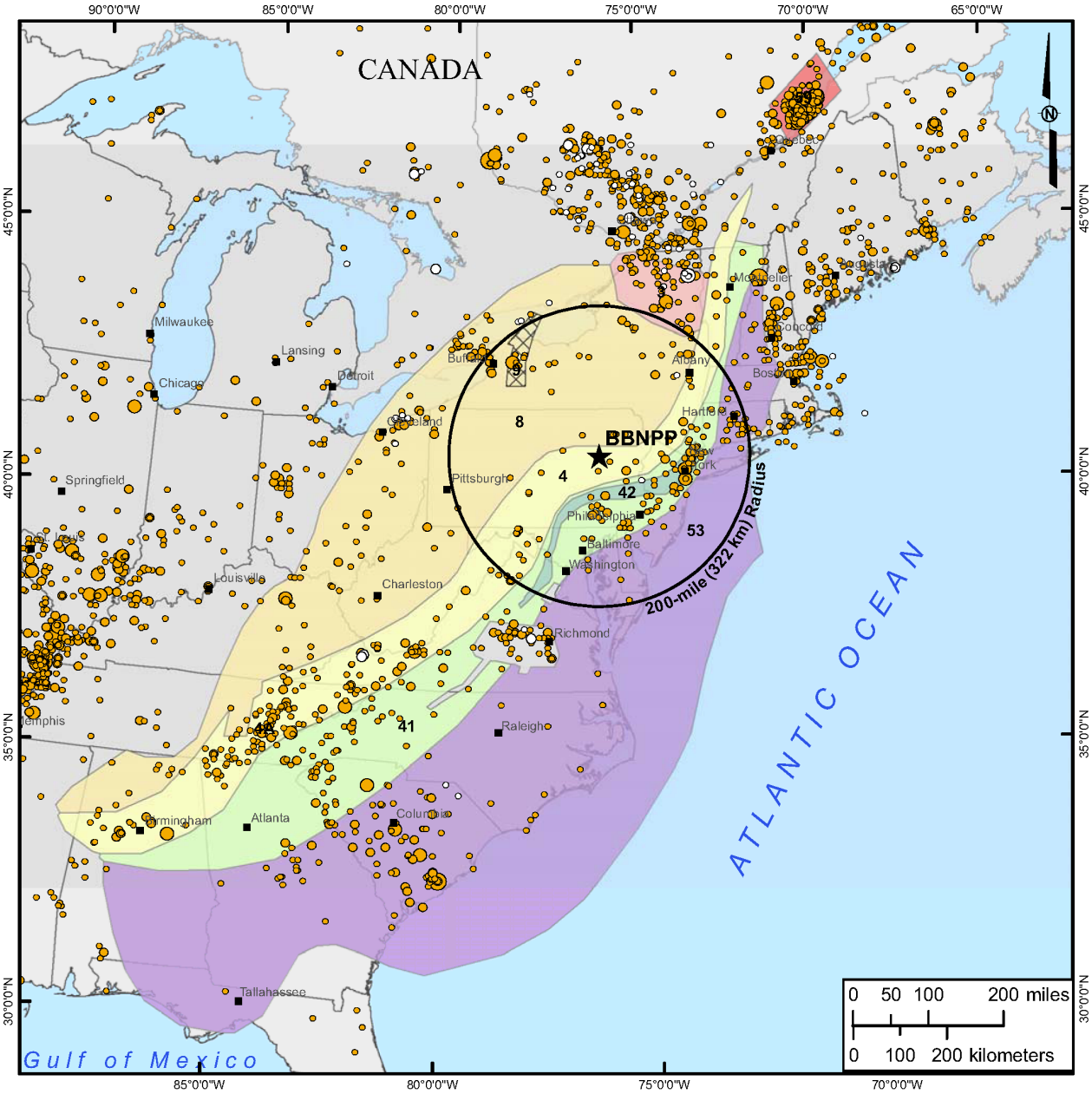
Figure 2.5-20—{Dames & Moore EPRI Source Zones}



LEGEND

★ Center Point of Proposed Bell Bend NPP (BBNPP)

■ City

○ NPP Reactor 200-mile (322 km) Radius

Earthquakes by Magnitude, mb (SEE NOTE)

USGS 2001	USGS 2002 to 2007
3.0 - 3.9	3.0 - 3.9
4.0 - 4.9	4.0 - 4.9
5.0 - 5.9	5.0 - 5.9
6.0 - 6.9	
7.0 - 7.9	

NOTE: The 2002 to 2007 seismicity shown in 500-mile (805 km) radius

Dames and Moore Sources contributing to 99% of BBNPP Site Hazard

- 3 Adirondacks Zone
- 4 Paleozoic Fold Belts
- 8 Eastern Marginal Basin
- 9 Clarendon-Linden Zone
- 41 Southern Cratonic Margin (default)
- 42 Newark-Gettysburg Basin
- 53 Southern Appalachian Mobile Belt (default)
- 59 La Malbaie/Charlevoix Zone

REFERENCES:
- ESRI, 2007.
- USGS 2007.
- ANSS, 2007.
- EPRI Volume VI: Dames and Moore, 1986.

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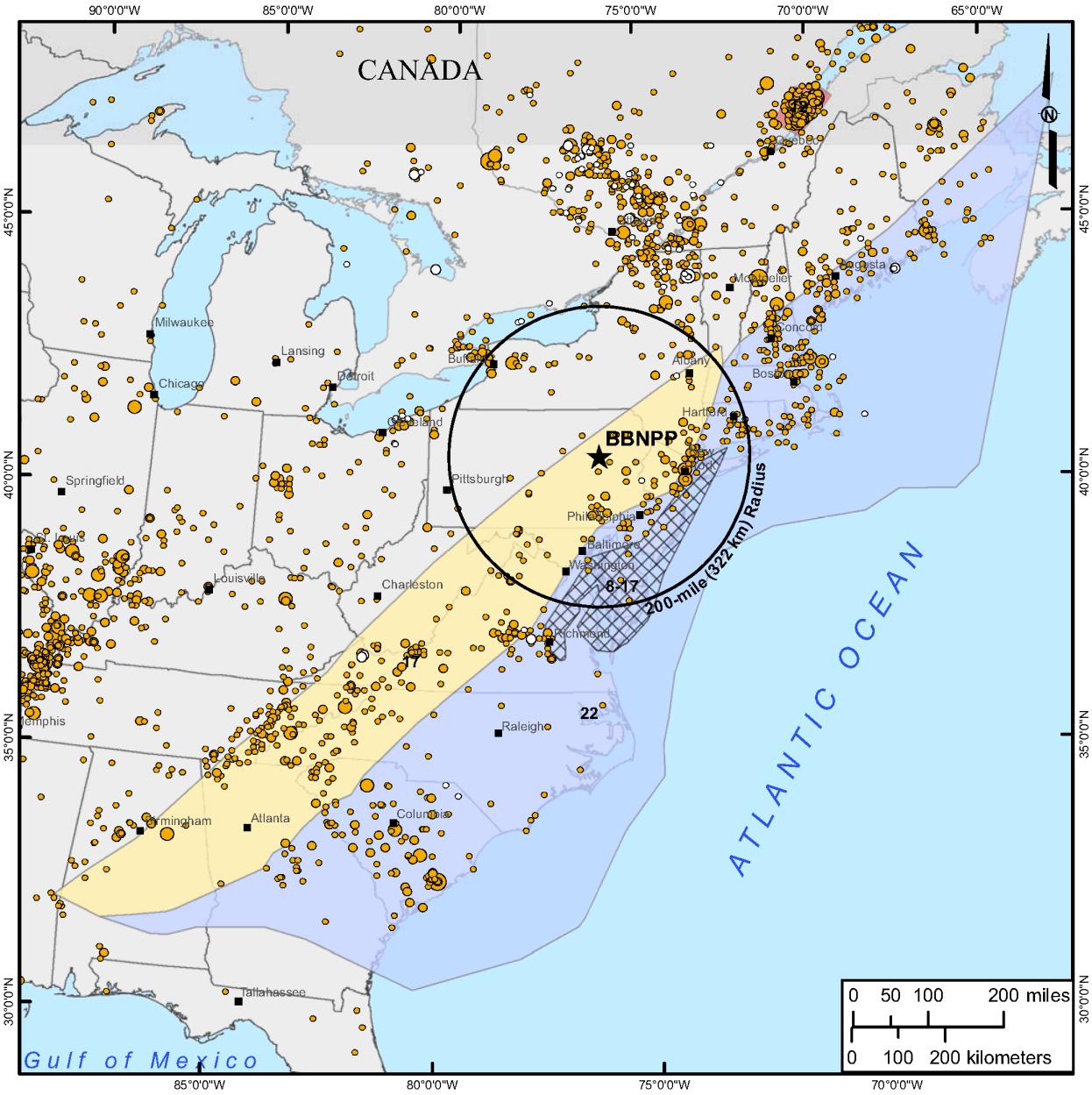
Figure 2.5-21—{Law Engineering EPRI Source Zones}



LEGEND

★ Center Point of Proposed Bell Bend NPP (BBNPP)

■ City

○ NPP Reactor 200-mile (322 km) Radius

Law Engineering Sources contributing to 99% of BBNPP Site Hazard

- 8-17 Buried East Coast Mesozoic Basins
- 17 Eastern Basements
- 22 Reactivated Eastern Seaboard Normal Faults
- 12 Charlevoix Seismic Zone

REFERENCES:
- ESRI, 2007.
- USGS 2007.
- ANSS, 2007.
- EPRI Volume VII: Law Engineering, 1986.

Earthquakes by Magnitude, mb (SEE NOTE)

USGS 2001	USGS 2002 to 2007
3.0 - 3.9	3.0 - 3.9
4.0 - 4.9	4.0 - 4.9
5.0 - 5.9	5.0 - 5.9
6.0 - 6.9	
7.0 - 7.9	

NOTE: The 2002 to 2007 seismicity shown in 500-mile (805 km) radius.

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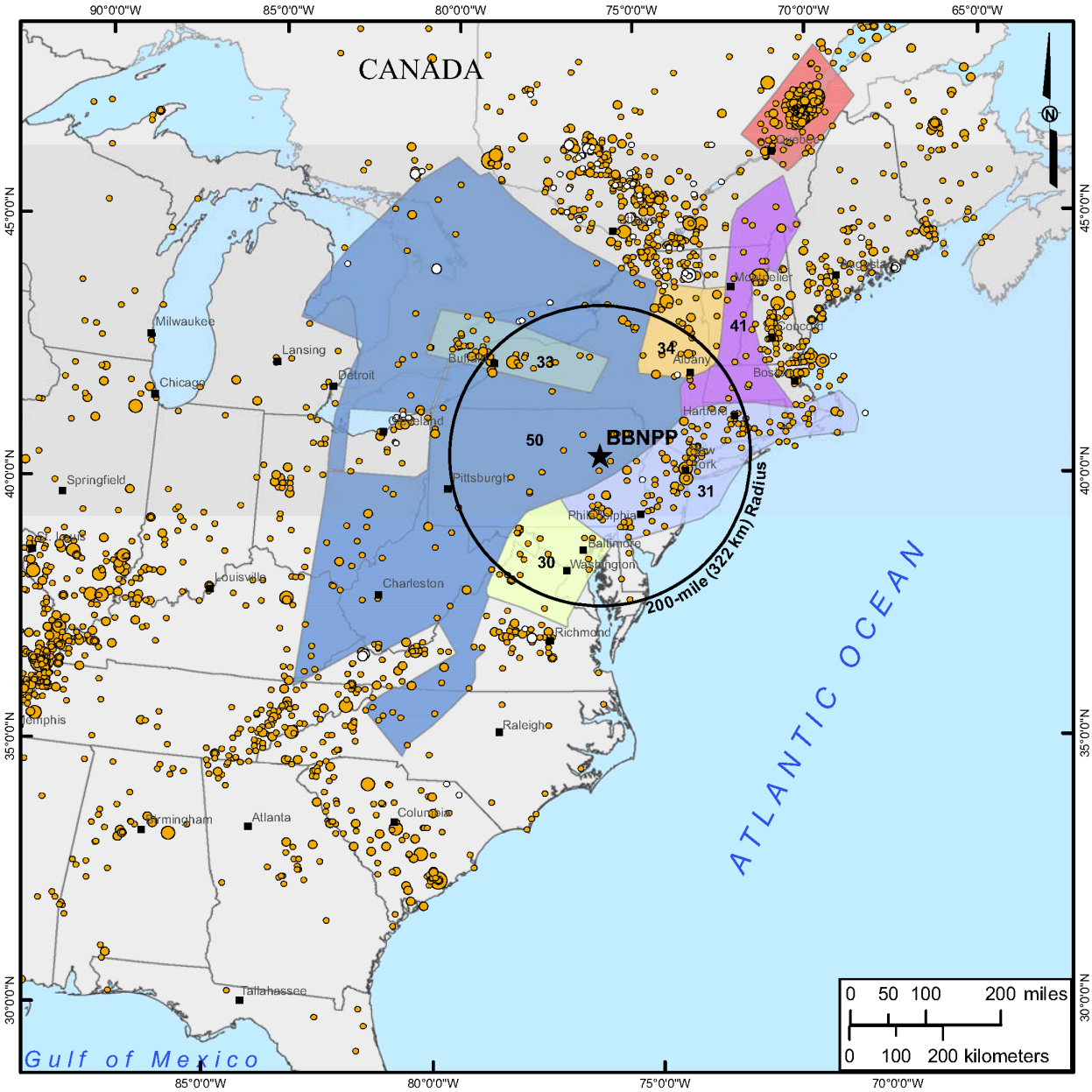
Figure 2.5-22—{Rondout Associates EPRI Source Zones}



LEGEND

★ Center Point of Proposed Bell Bend NPP (BBNPP)

▪ City

○ NPP Reactor 200-mile (322 km) Radius

Earthquakes by Magnitude, mb (SEE NOTE)

USGS 2001	USGS 2002 to 2007
3.0 - 3.9	3.0 - 3.9
4.0 - 4.9	4.0 - 4.9
5.0 - 5.9	5.0 - 5.9
6.0 - 6.9	
7.0 - 7.9	

NOTE: The 2002 to 2007 seismicity shown in 500-mile (805 km) radius.

Rondout Associates Sources contributing to 99% of BBNPP Site Hazard

- 30 Shenandoah
- 31 Quakers
- 33 Niagara
- 34 Nessmuk
- 37 La Malbaie (Charlevoix) Seismic Zone
- 41 Vermont
- 50 Grenville (Background)

REFERENCES:
- ESRI, 2007.
- USGS 2007.
- ANSS, 2007.
- EPRI Volume X: Rondout Associates, 1986.

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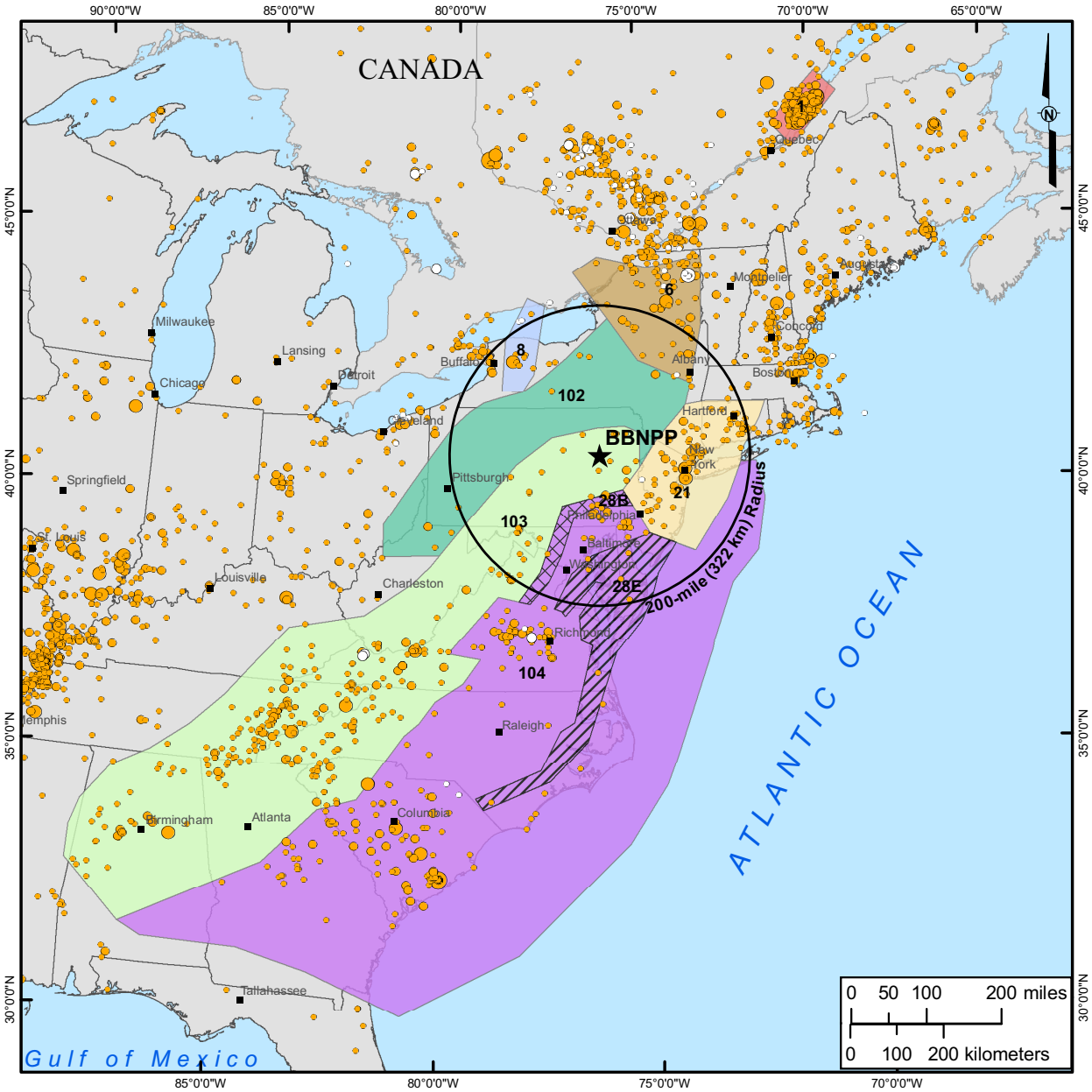
Figure 2.5-23—{Weston Geophysical EPRI Source Zones}



LEGEND

★ Center Point of Proposed Bell Bend NPP (BBNPP)

■ City

○ NPP Reactor 200-mile (322 km) Radius

Earthquakes by Magnitude, mb (SEE NOTE)

USGS 2001	USGS 2002 to 2007
3.0 - 3.9	3.0 - 3.9
4.0 - 4.9	4.0 - 4.9
5.0 - 5.9	5.0 - 5.9
6.0 - 6.9	
7.0 - 7.9	

NOTE: The 2002 to 2007 seismicity shown in 500-mile (805 km) radius.

Weston Geophysical Sources contributing to 99% of BBNPP Site Hazard

- 1 Charlevoix - La Malbaie Seismic Zone
- 6 Adirondack Mountains
- 8 Clarendon-Linden
- 21 New York Nexus
- 28B Zone of Mesozoic Basin
- 28E Zone of Mesozoic Basin
- 102 Appalachian Plateau Background
- 103 Southern Appalachian Background
- 104 Southern Coastal Plain Background

REFERENCES:
- ESRI, 2007.
- USGS 2007.
- ANSS, 2007.
- EPRI Volume V: Weston Geophysical, 1986.

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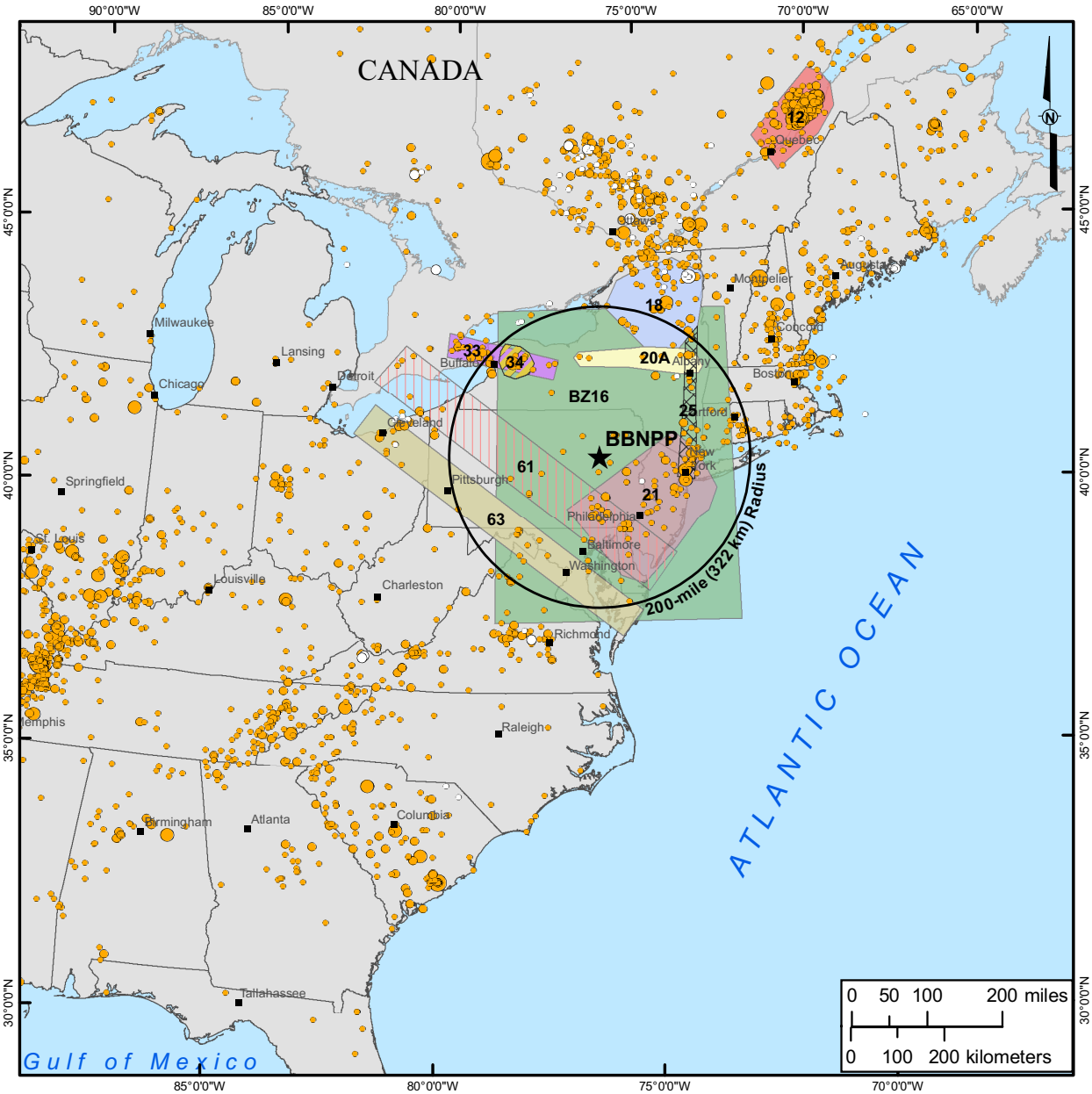
Figure 2.5-24—{Woodward-Clyde Consultants EPRI Source Zones}



LEGEND

★ Center Point of Proposed Bell Bend NPP (BBNPP)

▪ City

○ NPP Reactor 200-mile (322 km) Radius

Earthquakes by Magnitude, mb (SEE NOTE)

USGS 2001	USGS 2002 to 2007
3.0 - 3.9	3.0 - 3.9
4.0 - 4.9	4.0 - 4.9
5.0 - 5.9	5.0 - 5.9
6.0 - 6.9	
7.0 - 7.9	

NOTE: The 2002 to 2007 seismicity shown in 500-mile (805 km) radius.

Woodward-Clyde Sources contributing to 99% of BBNPP Site Hazard

- 18 Adirondack Uplift
- 20A Mohawk River Trend
- 21 NJ Isostatic Gravity Saddle
- 25 Hudson River Valley Trend
- 33 W. NY-S Ontario Trend
- 34 Attica, NY Intersection
- 63 Pittsburgh - Washington Lineament
- BZ16 Susquehanna Background
- 12 Charlevoix Seismic Zone
- 61 Tyrone - Mt. Union Lineament

REFERENCES:
- ESRI, 2007.
- USGS 2007.
- ANSS, 2007.
- EPRI Volume VIII: Woodward-Clyde Consultants, 1986.

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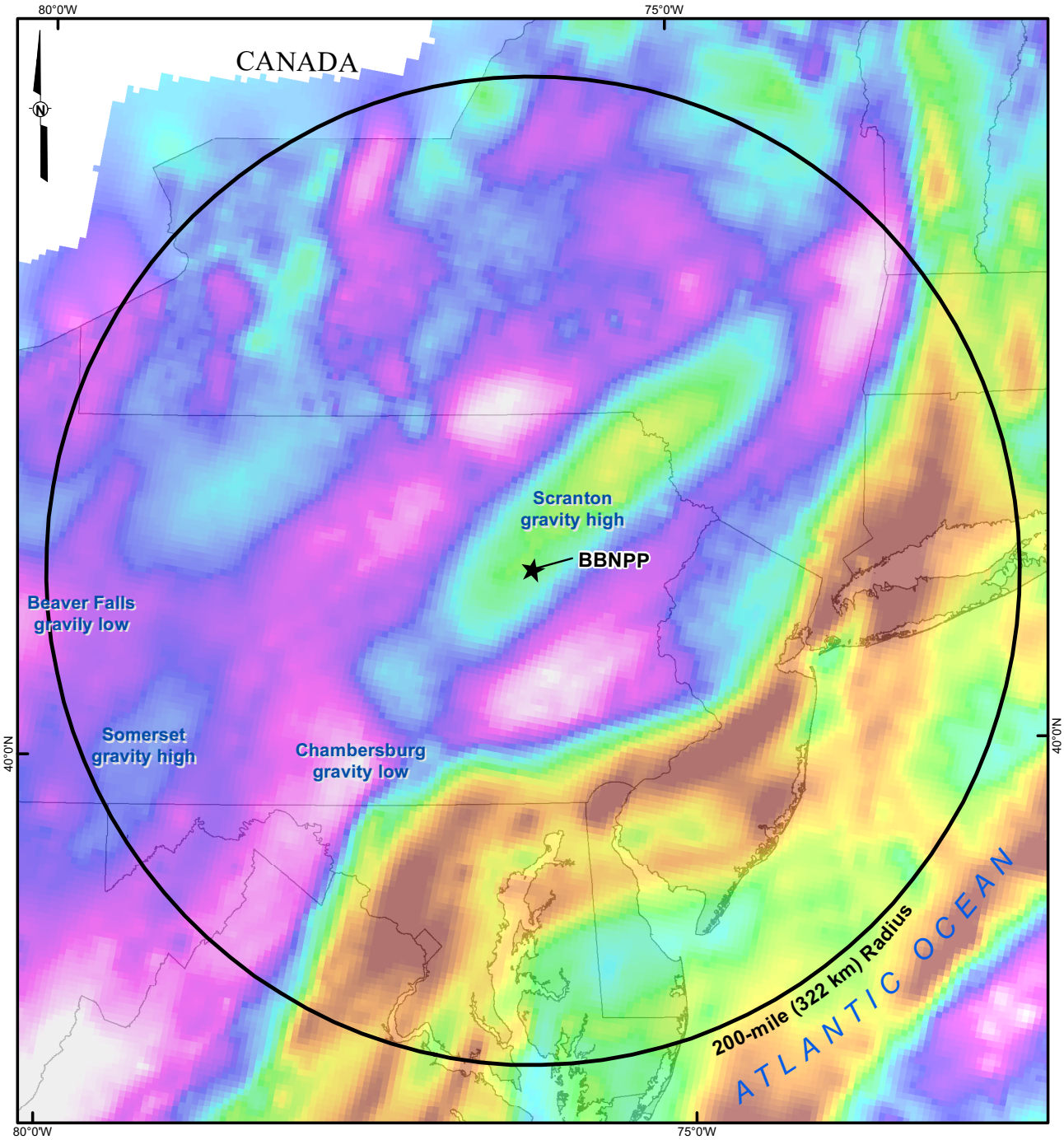
Figure 2.5-25—{Regional Bouguer Gravity Anomaly Map}



LEGEND

★ Center Point of Proposed Bell Bend NPP (BBNPP)

○ NPP Reactor 200-mile (322 km) Radius

Gravity Anomaly

0 95 mgals

-340 mgals

0 25 50 100 miles

0 25 50 100 kilometers

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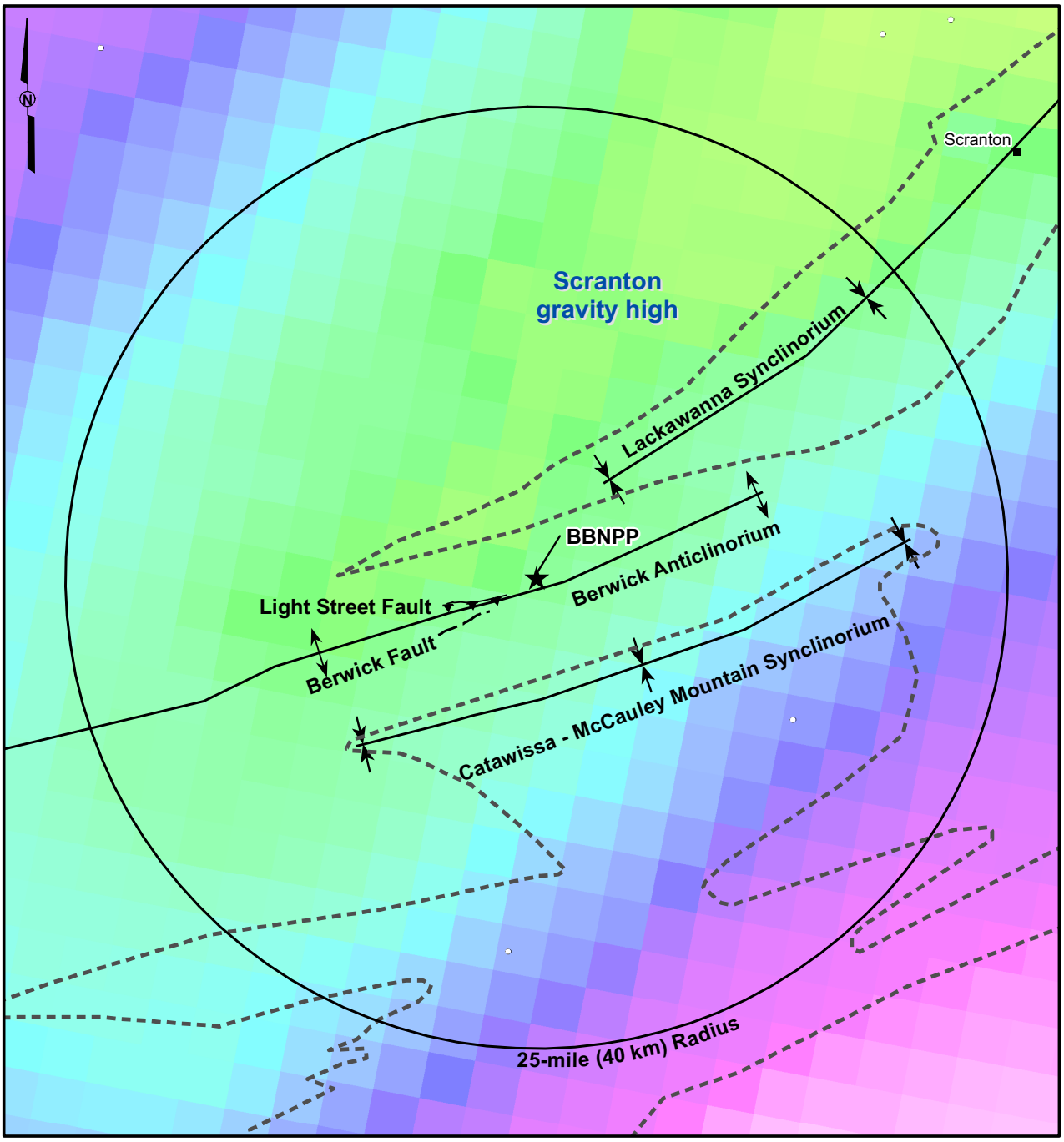
Figure 2.5-26—{Site Vicinity Bouguer Gravity Anomaly Map}



LEGEND

★ Center Point of Proposed Bell Bend NPP (BBNPP)

○ NPP Reactor 25-mile (40 km) Radius

— — Anthracite Region

Earthquakes by Magnitude, m_b

- 3.0 - 3.9
- 4.0 - 4.9
- 5.0 - 5.9

Gravity Anomaly

0 - 95 mgals

-340 mgals

0 2.5 5 10 miles

0 2.5 5 10 kilometers

REFERENCE:
- Kucks, 1999.
- Harrison, 2004.
- USGS, 2007.

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Figure 2.5-27—{Regional Magnetic Anomaly Map}

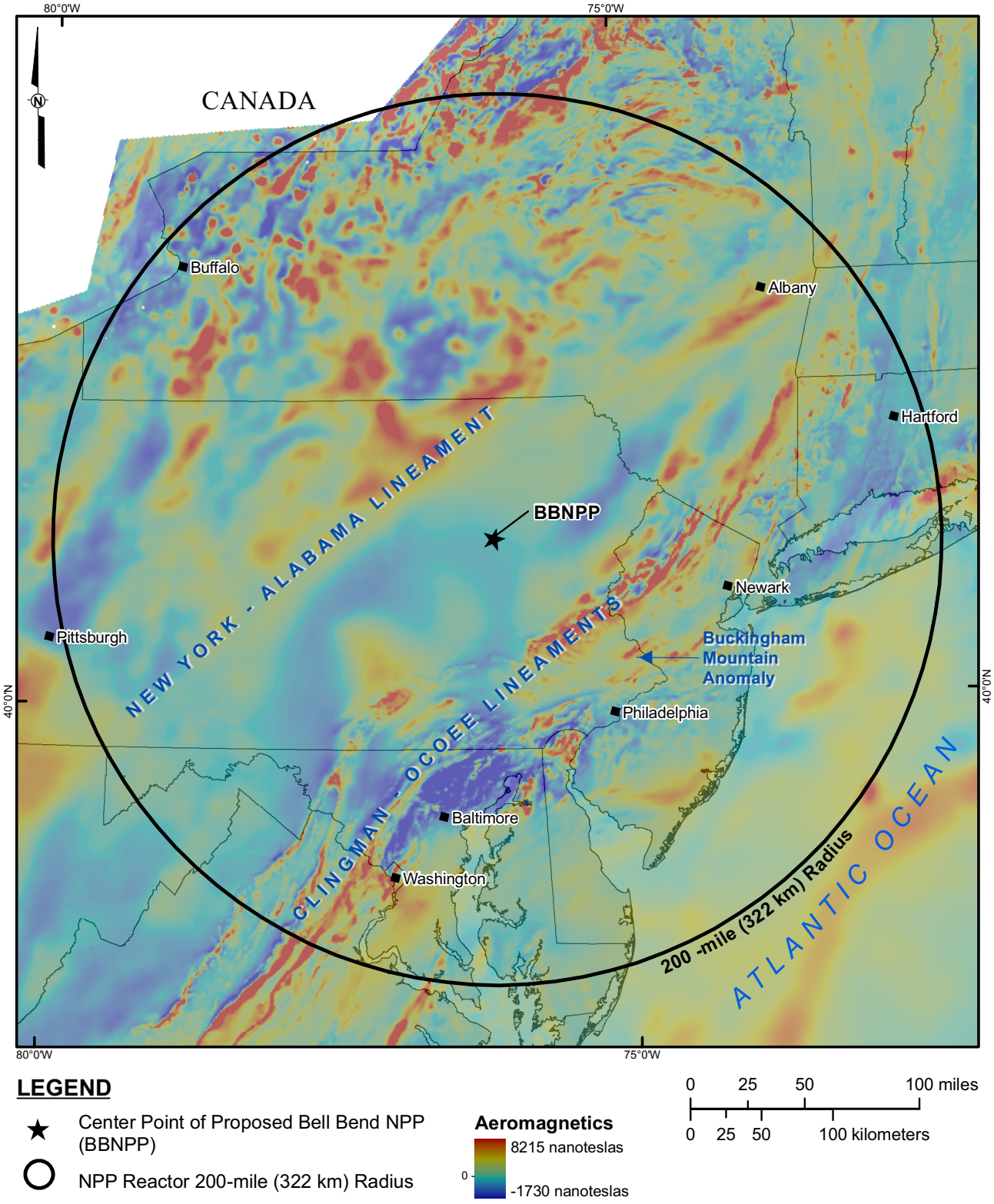

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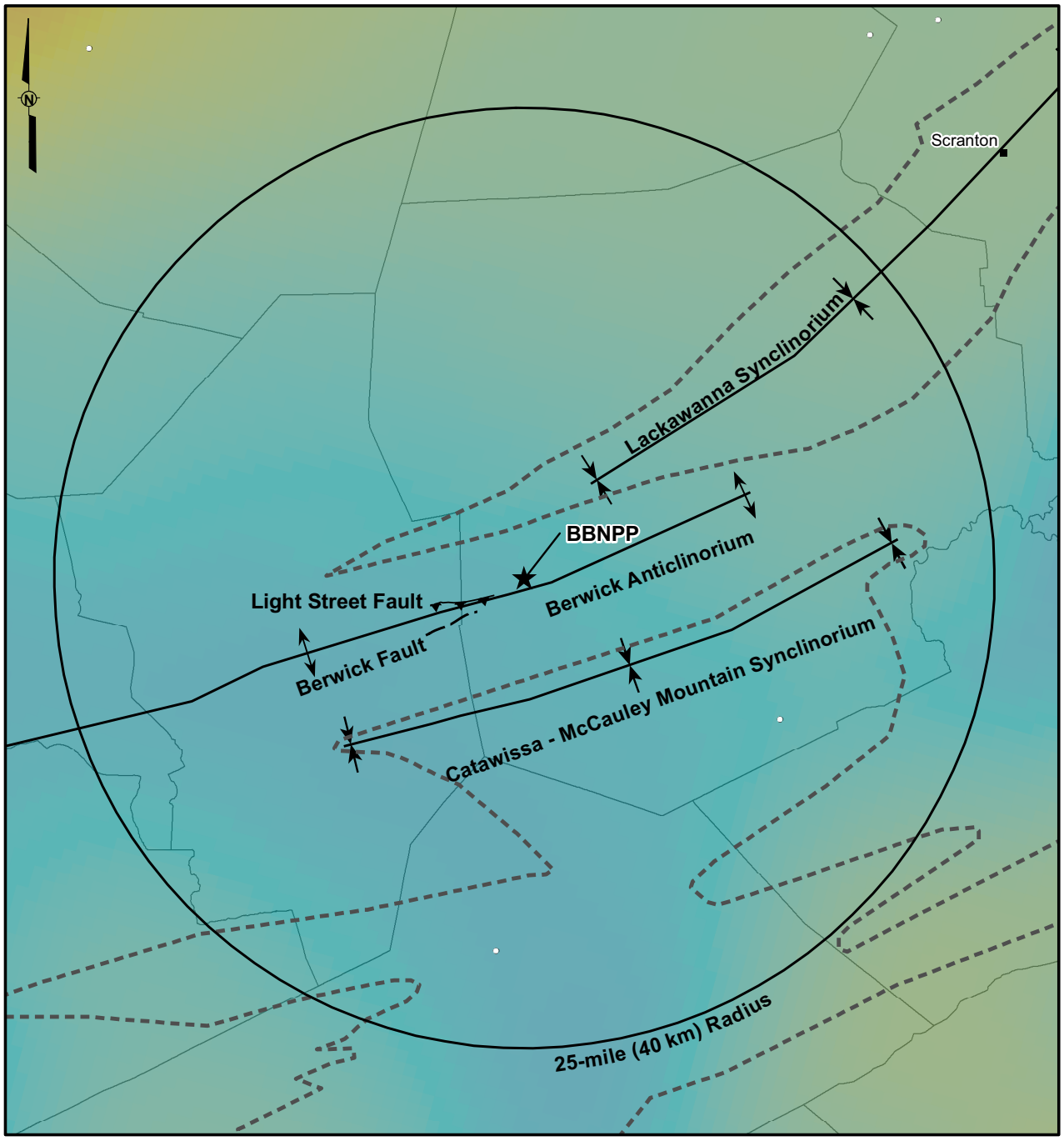
Figure 2.5-28—{Site Vicinity Magnetic Anomaly Map}



LEGEND

★ Center Point of Proposed Bell Bend NPP (BBNPP)

○ NPP Reactor 25-mile (40 km) Radius

— — Anthracite Region

Earthquakes by Magnitude, m_b

- 3.0 - 3.9
- 4.0 - 4.9
- 5.0 - 5.9

Aeromagnetics

8215 nanoteslas

0

-1730 nanoteslas

0 2.5 5 10 miles

0 2.5 5 10 kilometers

REFERENCE:
- Bankey, 2002.
- Harrison, 2004.
- USGS, 2007.

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Figure 2.5-29—{Site Specific Stratigraphic Column}

Era	Period	Epoch	Age (Ma)	Unit	Thickness (ft)
Cenozoic	Quaternary	Holocene	0.01	**Stratified Drift**	38.5
		Pleistocene	1.8		
Paleozoic	Devonian	Upper	360	**Harrell Formation**	150
		Middle	370	Hamilton Group: **Mahantango Formation**	1,500
				Hamilton Group: **Marcellus Formation**	350
				Onondaga Formation	175
		Lower	391	**Old Port Formation**	100-150
	Silurian	Upper	417	**Keyser Formation**	125
				Tonoloway Formation	100
				Wills Creek Formation	750
		Lower	423	**Bloomsburg Formation**	464
				Mifflintown Formation	336
				Keefer Formation	670-1,070
				Rose Hill Formation	
				Tuscarora Formation	400-700
	Ordovician	Upper	443	**Juniata Formation**	600-1,125
				Bald Eagle Formation	700-1,313
				Reedsville Formation	600-1,800
		Middle	458	**Trenton Group** Antes Shale Coburn Limestone Salona Limestone	842
				Black River Group	632
				Loysburg Formation	263-475
		Lower	470	**Beekmantown Group** Bellefonte Dolomite Axemann Limestone Nittany Dolomite Stonehenge Formation	3,159-4,200
	Cambrian	Upper	490	**Gatesburg Formation**	1,211
		Middle	510	**Warrior Formation**	400-1,340
				Pleasant Hill Formation	NOT REPORTED
		Lower	520	**Waynesboro Formation**	1,000+
Neo-Proterozoic	Ediacaran		543	Metamorphic/Igneous	

REFERENCES:
- Crangle, 2002
- Gold, 2003
- Inners, 1978
- Kauffman, 1999
- Laughrey, 1999
- McElroy, 2007
- Thompson, 1999

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Figure 2.5-30—{Ten-Foot Solid Core of Mahantango Shale with No Open Fractures}

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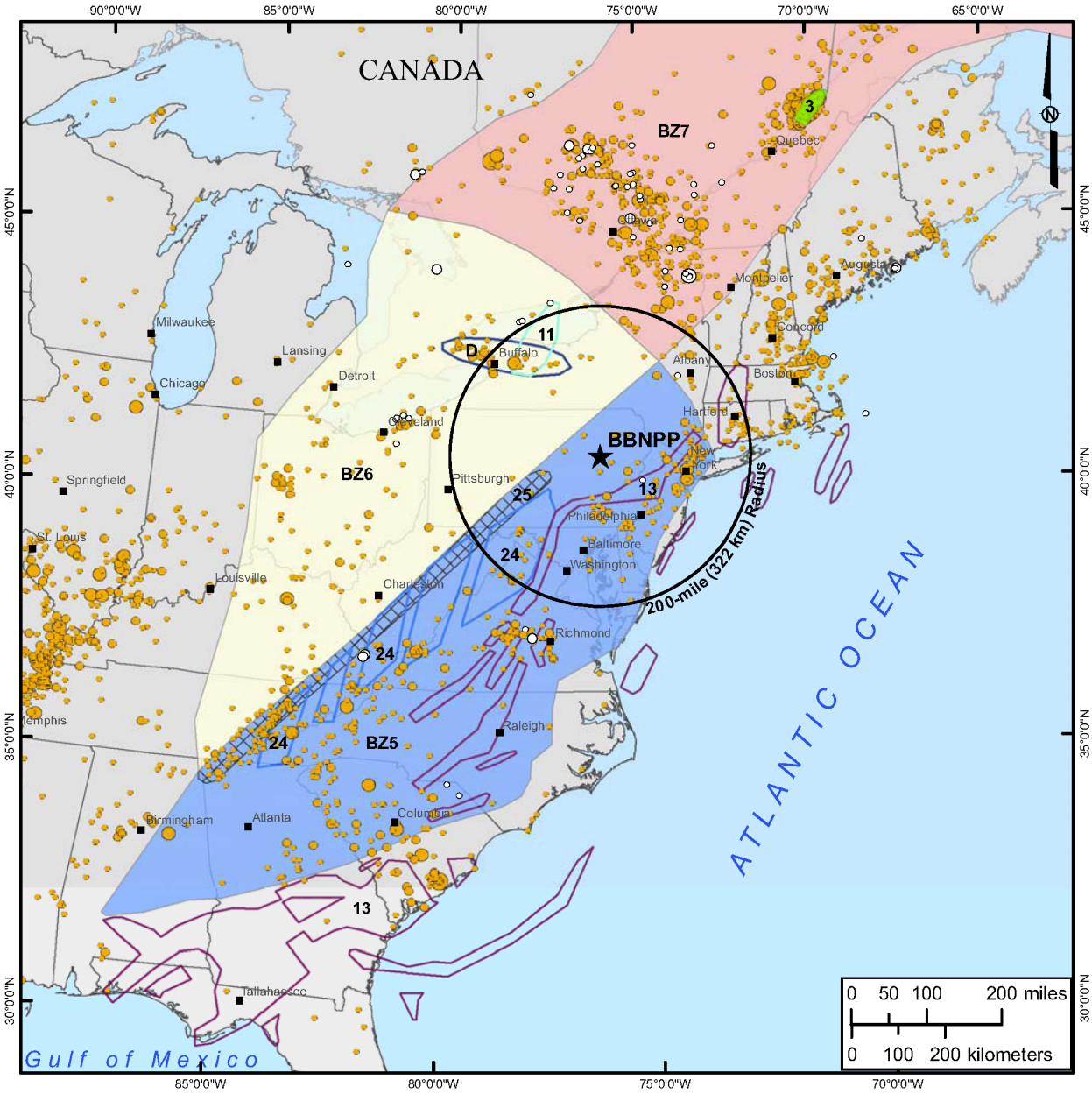
Figure 2.5-31—{Bechtel Group EPRI Source Zones}



LEGEND

★ Center Point of Proposed Bell Bend NPP (BBNPP)

■ City

○ NPP Reactor 200-mile (322 km) Radius

Earthquakes by Magnitude, mb (SEE NOTE)

USGS 2001	USGS 2002 to 2007
3.0 - 3.9	3.0 - 3.9
4.0 - 4.9	4.0 - 4.9
5.0 - 5.9	5.0 - 5.9
6.0 - 6.9	
7.0 - 7.9	

NOTE: The 2002 to 2007 seismicity shown in 500-mile (805 km) radius.

Bechtel Group Sources contributing to 99% of BBNPP Site Hazard

- 3 La Malbaie
- 11 Clarendon-Linden
- 13 Mesozoic Basins
- 24 Bristol Block
- 25 NY-AL Lineament
- BZ5 Southern Appalachians Background
- BZ6 Southern Eastern Craton Background
- BZ7 Northern Eastern Craton Background
- D Niagara Area

REFERENCES:
- ESRI, 2007.
- USGS 2007.
- ANSS, 2007.
- EPRI Volume IX: Bechtel Group, 1986.

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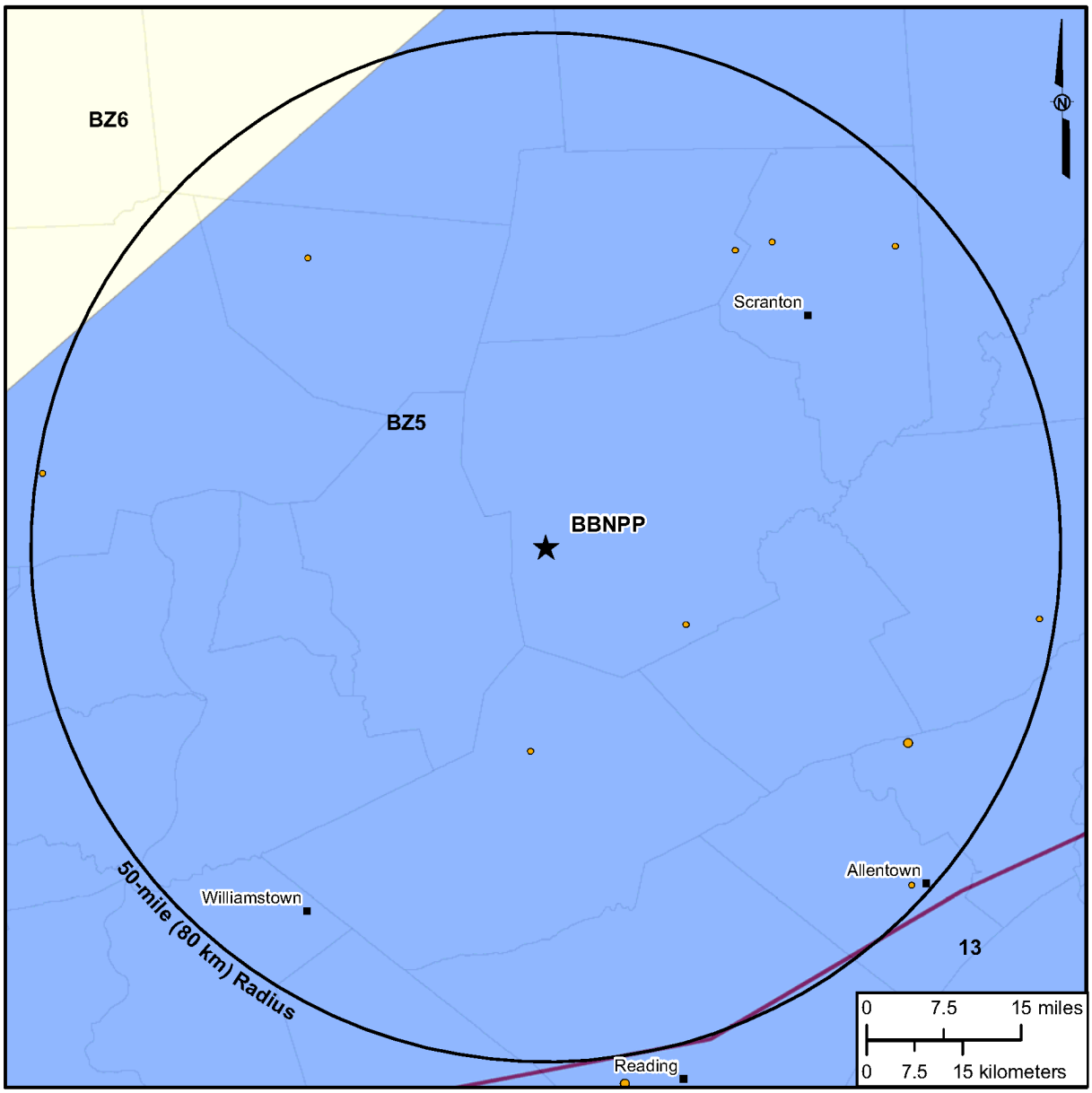
Figure 2.5-32—{Bechtel Group EPRI Source Zones 50-mile Radius}



LEGEND

- ★ Center Point of Proposed Bell Bend NPP (BBNPP)
- ▪ City
- ○ NPP Reactor 50-mile (80 km) Radius

Earthquakes by Magnitude, m_b

USGS 2001	USGS 2002 to 2007
3.0 - 3.9	3.0 - 3.9
4.0 - 4.9	4.0 - 4.9
5.0 - 5.9	5.0 - 5.9
6.0 - 6.9	
7.0 - 7.9	

Bechtel Group Sources contributing to 99% of BBNPP Site Hazard

- 3 La Malbaie
- 11 Clarendon-Linden
- 13 Mesozoic Basins
- 24 Bristol Block
- 26 NY-AL Lineament
- BZ5 Southern Appalachians Background
- BZ6 Southern Eastern Craton Background
- BZ7 Northern Eastern Craton Background
- D Niagara Area

REFERENCES:
- ESRI, 2007.
- USGS 2007.
- ANSS, 2007.
- EPRI Volume IX: Bechtel Group, 1986.

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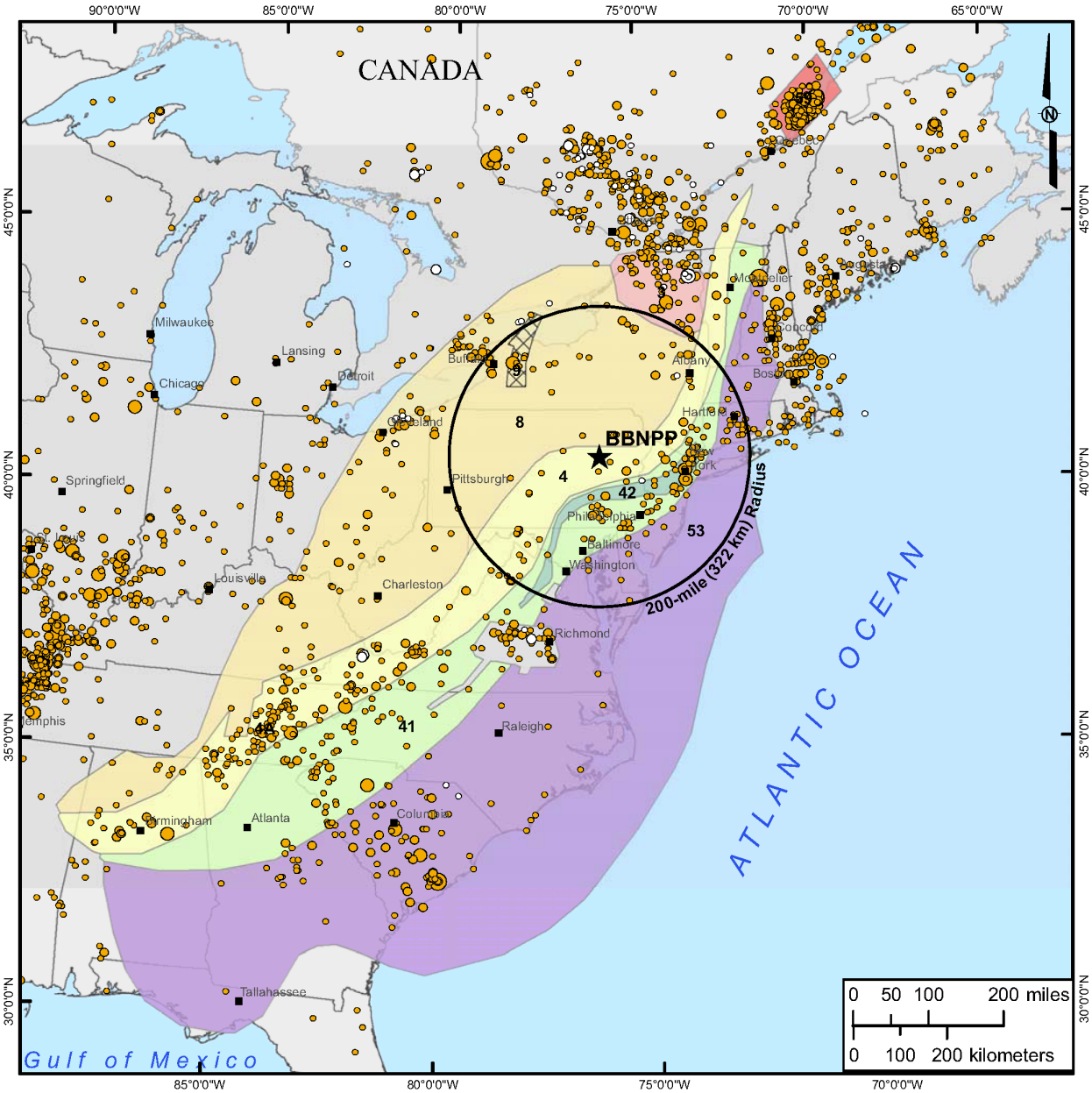
Figure 2.5-33—{Dames & Moore EPRI Source Zones}



LEGEND

★ Center Point of Proposed Bell Bend NPP (BBNPP)

■ City

○ NPP Reactor 200-mile (322 km) Radius

Earthquakes by Magnitude, mb (SEE NOTE)

USGS 2001	USGS 2002 to 2007
3.0 - 3.9	3.0 - 3.9
4.0 - 4.9	4.0 - 4.9
5.0 - 5.9	5.0 - 5.9
6.0 - 6.9	
7.0 - 7.9	

NOTE: The 2002 to 2007 seismicity shown in 500-mile (805 km) radius.

Dames and Moore Sources contributing to 99% of BBNPP Site Hazard

- 3 Adirondacks Zone
- 4 Paleozoic Fold Belts
- 8 Eastern Marginal Basin
- 9 Clarendon-Linden Zone
- 41 Southern Cratonic Margin (default)
- 42 Newark-Gettysburg Basin
- 53 Southern Appalachian Mobile Belt (default)
- 59 La Malbaie/Charlevoix Zone

REFERENCES:
- ESRI, 2007.
- USGS 2007.
- ANSS, 2007.
- EPRI Volume VI: Dames and Moore, 1986.

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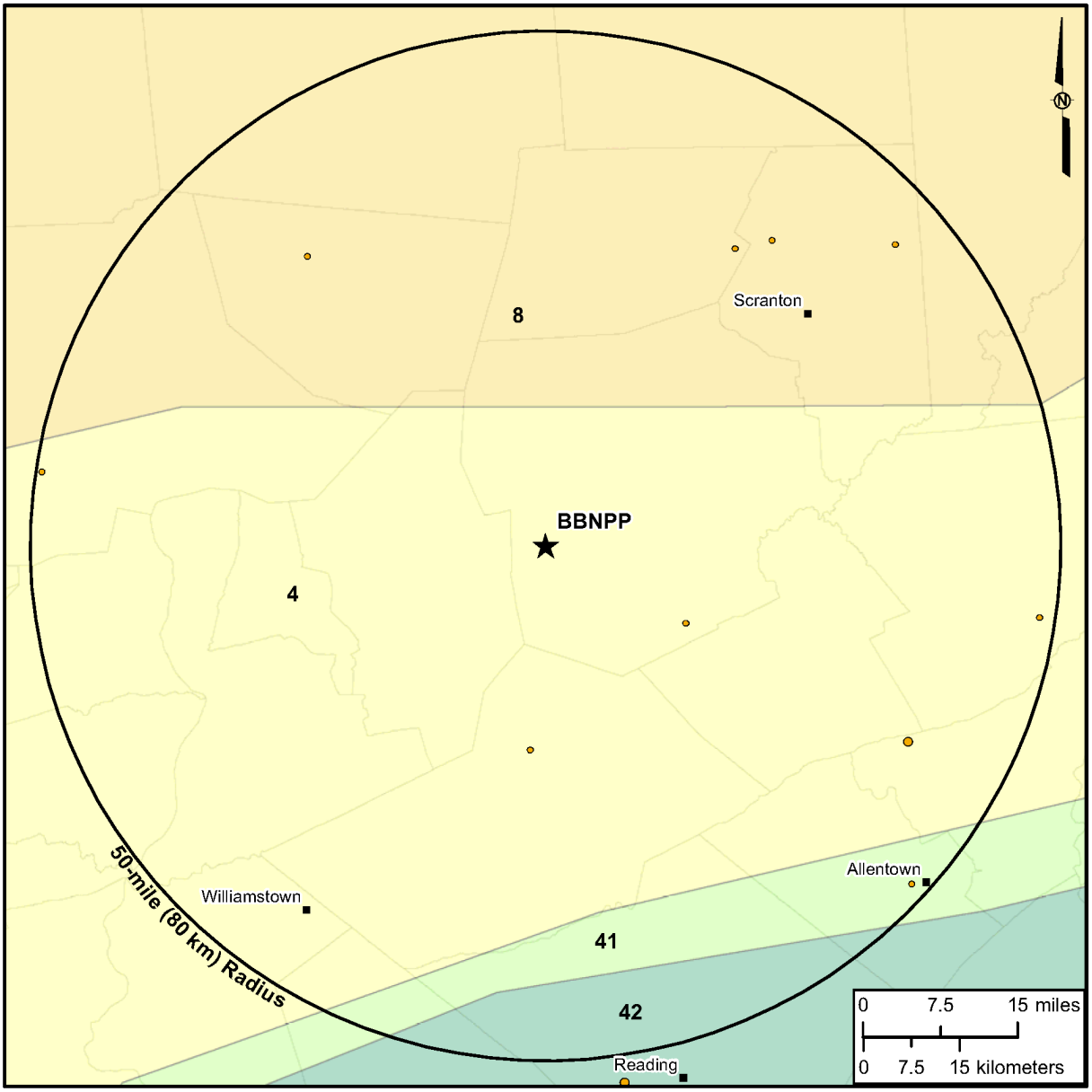
Figure 2.5-34—{Dames & Moore EPRI Source Zones 50-mile Radius}



LEGEND

- ★ Center Point of Proposed Bell Bend NPP (BBNPP)
- ▪ City
- ○ NPP Reactor 50-mile (80 km) Radius

Earthquakes by Magnitude, m_b

USGS 2001	USGS 2002 to 2007
3.0 - 3.9	3.0 - 3.9
4.0 - 4.9	4.0 - 4.9
5.0 - 5.9	5.0 - 5.9
6.0 - 6.9	
7.0 - 7.9	

Dames and Moore Sources contributing to 99% of BBNPP Site Hazard

- 3 Adirondacks Zone
- 4 Paleozoic Fold Belts
- 8 Eastern Marginal Basin
- 9 Clarendon-Linden Zone
- 41 Southern Cratonic Margin (default)
- 42 Newark-Gettysburg Basin
- 53 Southern Appalachian Mobile Belt (default)
- 59 La Malbaie/Charlevoix Zone

REFERENCES:
- ESRI, 2007.
- USGS 2007.
- ANSS, 2007.
- EPRI Volume VI: Dames and Moore, 1986.

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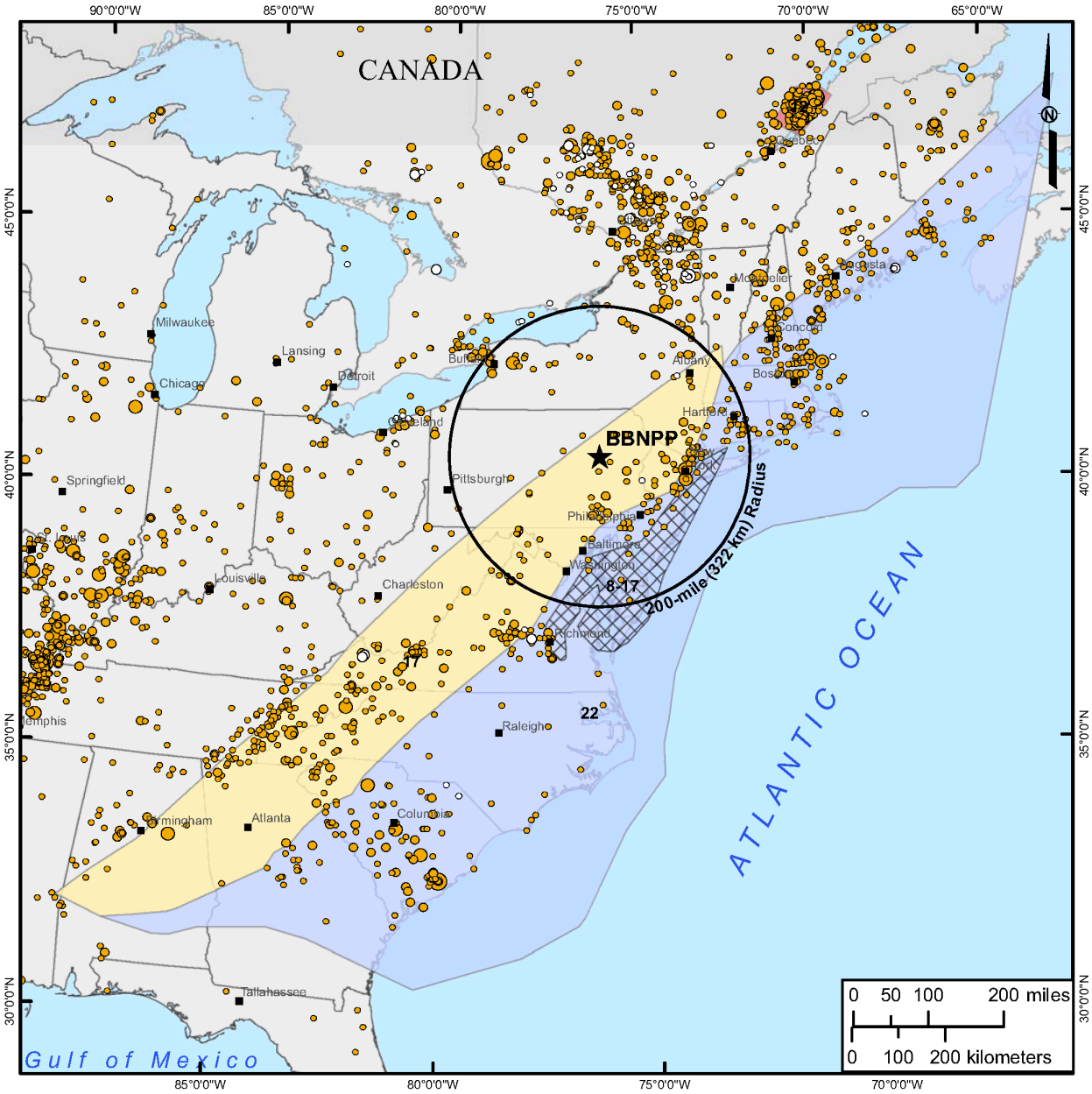
Figure 2.5-35—{Law Engineering EPRI Source Zones}



LEGEND

★ Center Point of Proposed Bell Bend NPP (BBNPP)

■ City

○ NPP Reactor 200-mile (322 km) Radius

Law Engineering Sources contributing to 99% of BBNPP Site Hazard

- 8-17 Buried East Coast Mesozoic Basins
- 17 Eastern Basements
- 22 Reactivated Eastern Seaboard Normal Faults
- 12 Charlevoix Seismic Zone

REFERENCES:
- ESRI, 2007.
- USGS 2007.
- ANSS, 2007.
- EPRI Volume VII: Law Engineering, 1986.

Earthquakes by Magnitude, mb (SEE NOTE)

USGS 2001	USGS 2002 to 2007
3.0 - 3.9	3.0 - 3.9
4.0 - 4.9	4.0 - 4.9
5.0 - 5.9	5.0 - 5.9
6.0 - 6.9	
7.0 - 7.9	

NOTE: The 2002 to 2007 seismicity shown in 500-mile (805 km) radius.

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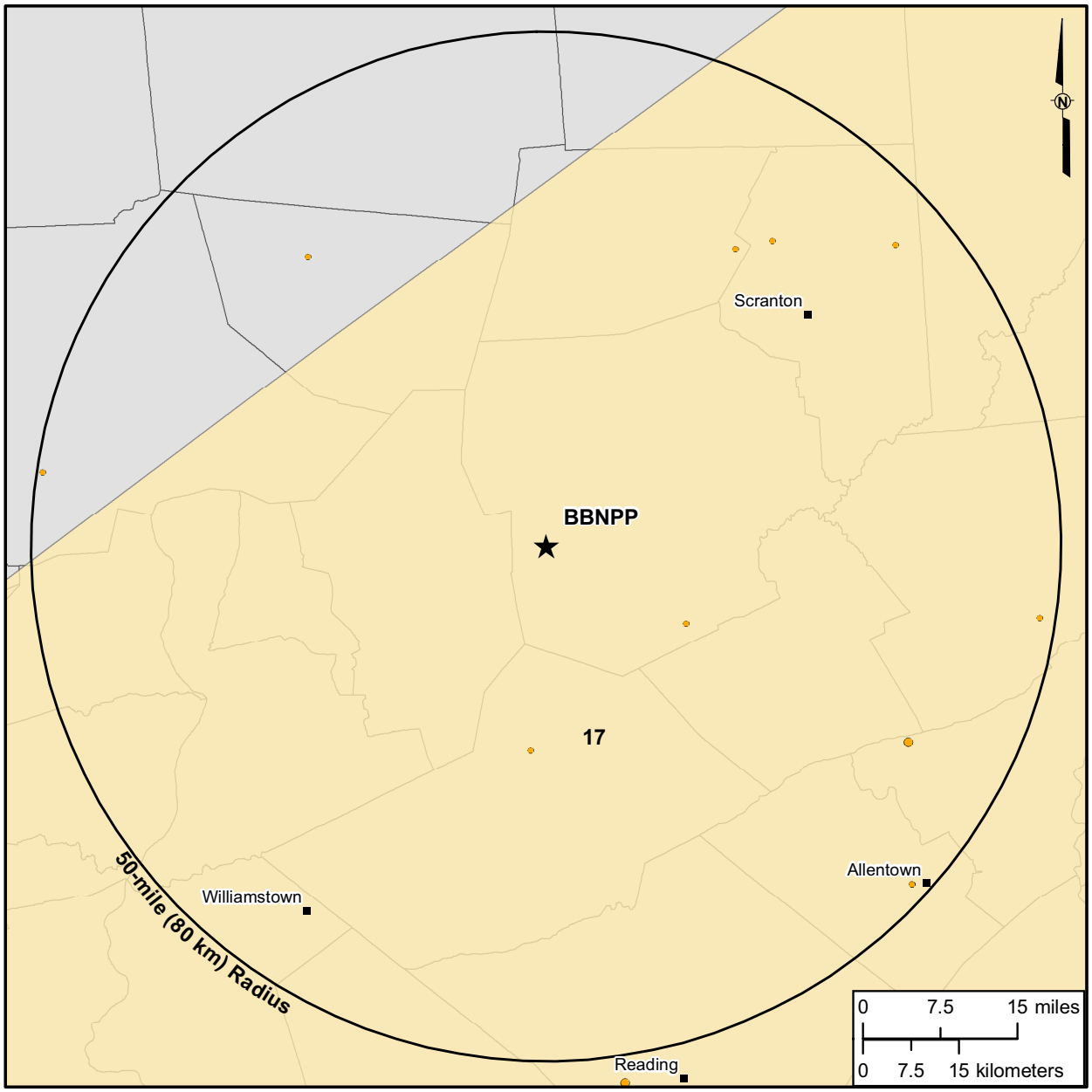
Figure 2.5-36—{Law Engineering EPRI Source Zones 50-mile Radius}



LEGEND

★ Center Point of Proposed Bell Bend NPP (BBNPP)

■ City

○ NPP Reactor 50-mile (80 km) Radius

Earthquakes by Magnitude, m_b

USGS 2001	USGS 2002 to 2007
3.0 - 3.9	3.0 - 3.9
4.0 - 4.9	4.0 - 4.9
5.0 - 5.9	5.0 - 5.9
6.0 - 6.9	
7.0 - 7.9	

Law Engineering Sources contributing to 99% of BBNPP Site Hazard

- 8-17 Buried East Coast Mesozoic Basins
- 17 Eastern Basements
- 22 Reactivated Eastern Seaboard Normal Faults
- 12 Charlevoix Seismic Zone

REFERENCES:
- ESRI, 2007.
- USGS 2007.
- ANSS, 2007.
- EPRI Volume VII: Law Engineering, 1986.

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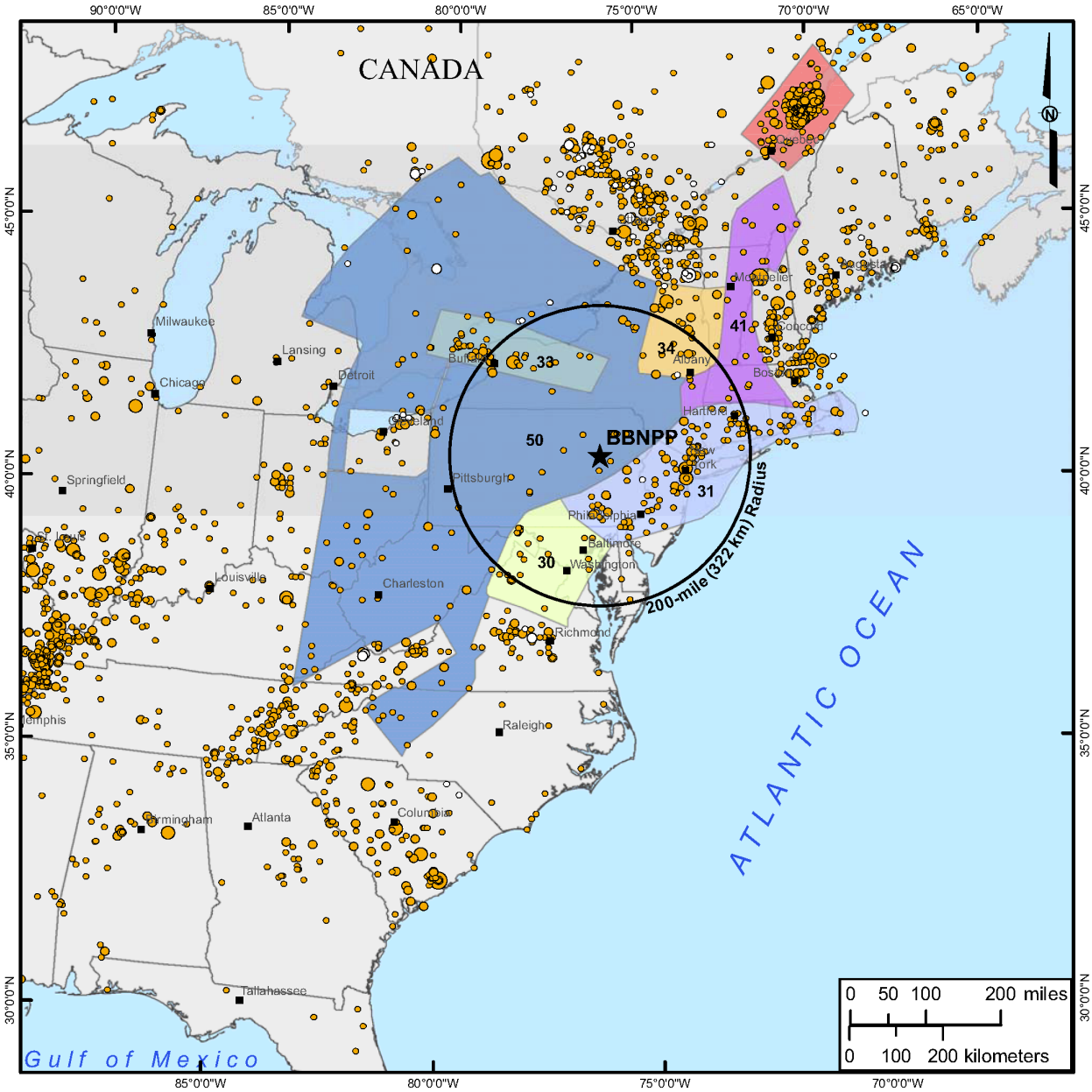
Figure 2.5-37—{Rondout Associates EPRI Source Zones}



LEGEND

★ Center Point of Proposed Bell Bend NPP (BBNPP)

▪ City

○ NPP Reactor 200-mile (322 km) Radius

Earthquakes by Magnitude, mb (SEE NOTE)

USGS 2001	USGS 2002 to 2007
3.0 - 3.9	3.0 - 3.9
4.0 - 4.9	4.0 - 4.9
5.0 - 5.9	5.0 - 5.9
6.0 - 6.9	
7.0 - 7.9	

NOTE: The 2002 to 2007 seismicity shown in 500-mile (805 km) radius.

Rondout Associates Sources contributing to 99% of BBNPP Site Hazard

- 30 Shenandoah
- 31 Quakers
- 33 Niagara
- 34 Nessmuk
- 37 La Malbaie (Charlevoix) Seismic Zone
- 41 Vermont
- 50 Grenville (Background)

REFERENCES:
- ESRI, 2007.
- USGS 2007.
- ANSS, 2007.
- EPRI Volume X: Rondout Associates, 1986.

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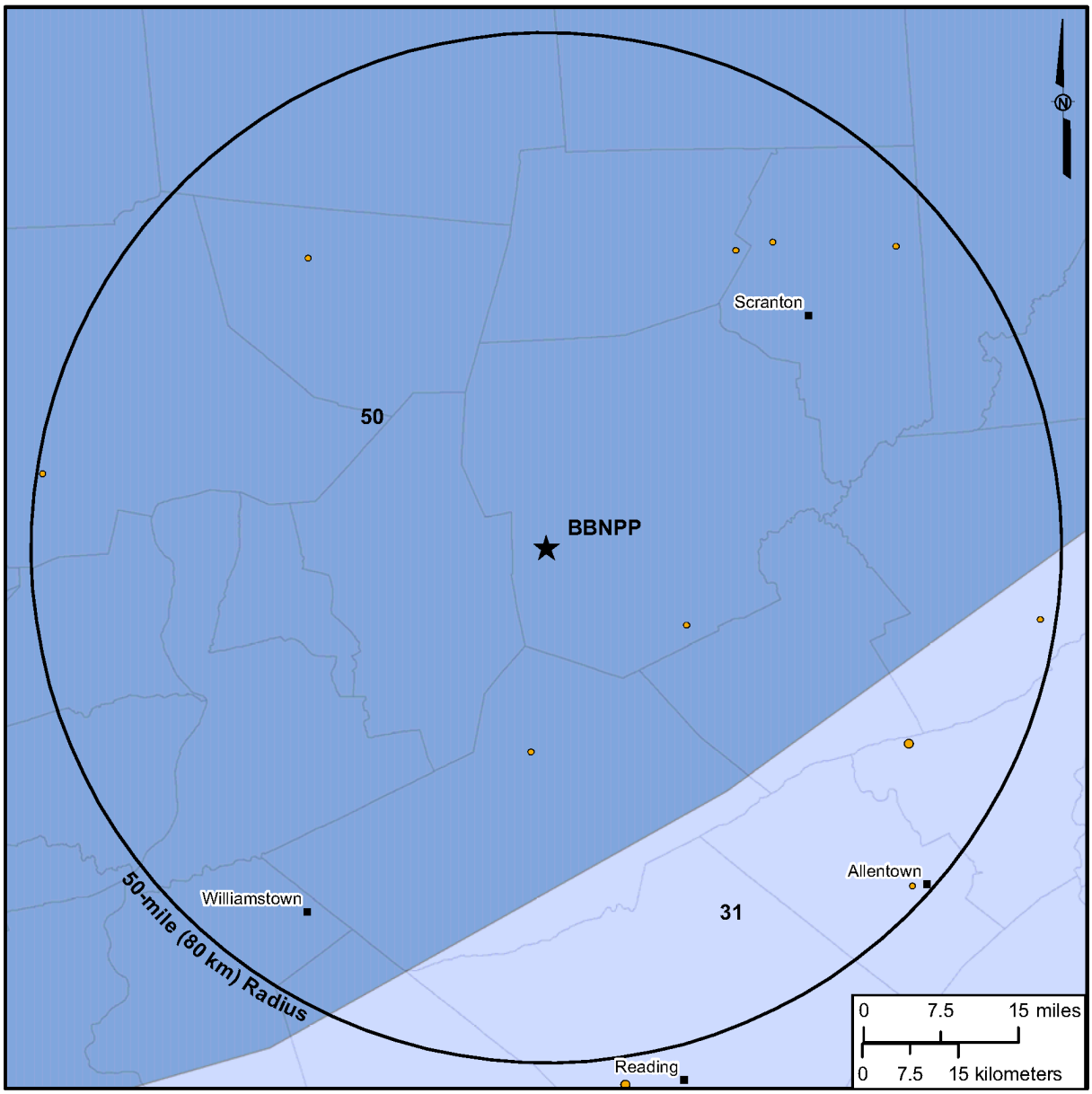
Figure 2.5-38—{Rondout Associates EPRI Source Zones 50-mile Radius}



LEGEND

- ★ Center Point of Proposed Bell Bend NPP (BBNPP)
- ■ City
- ○ NPP Reactor 50-mile (80 km) Radius

Earthquakes by Magnitude, m_b

USGS 2001	USGS 2002 to 2007
3.0 - 3.9	3.0 - 3.9
4.0 - 4.9	4.0 - 4.9
5.0 - 5.9	5.0 - 5.9
6.0 - 6.9	
7.0 - 7.9	

Rondout Associates Sources contributing to 99% of BBNPP Site Hazard

- 30 Shenandoah
- 31 Quakers
- 33 Niagara
- 34 Nessmuk
- 37 La Malbaie (Charlevoix) Seismic Zone
- 41 Vermont
- 50 Grenville (Background)

REFERENCES:
- ESRI, 2007.
- USGS 2007.
- ANSS, 2007.
- EPRI Volume X: Rondout Associates, 1986.

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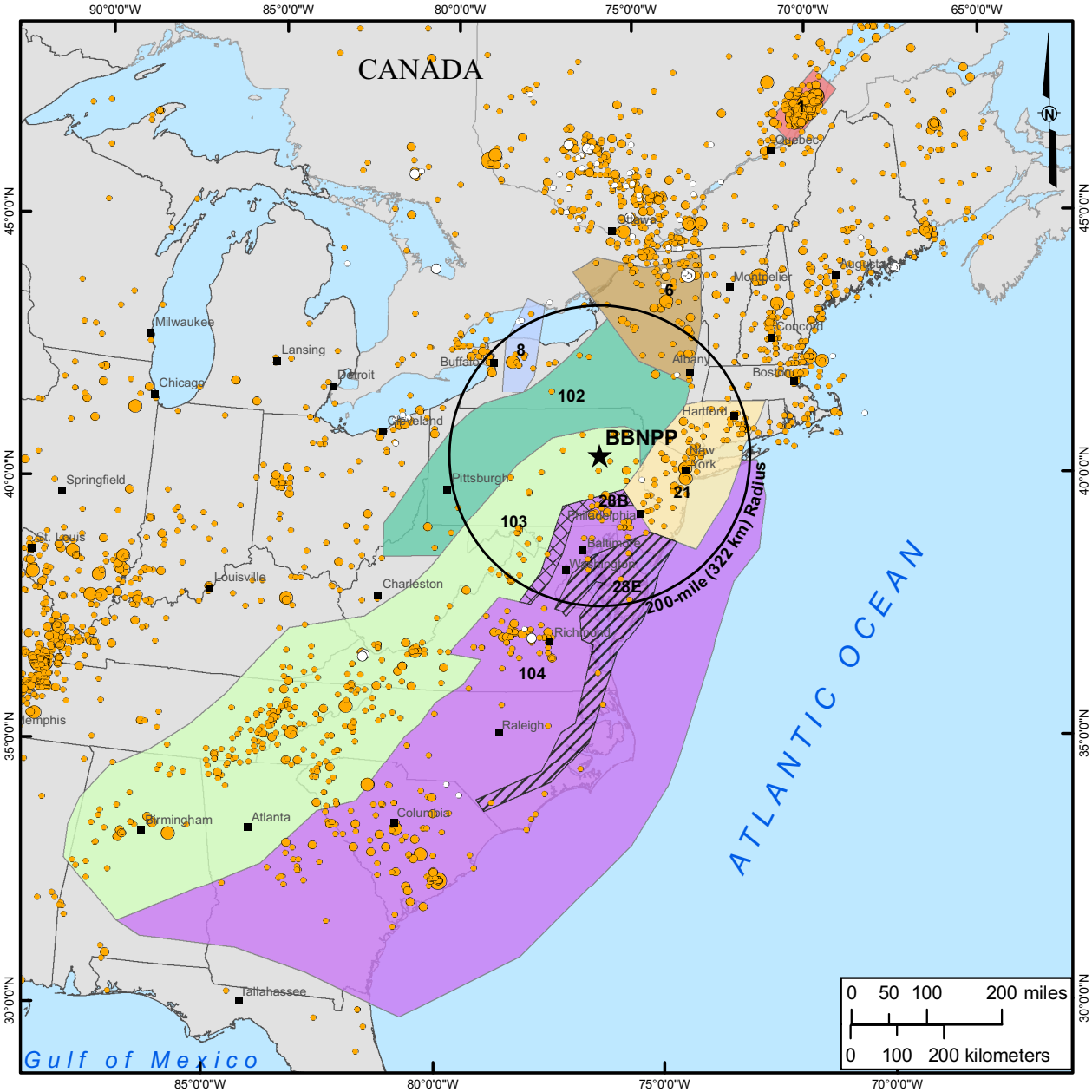
Figure 2.5-39—{Weston Geophysical EPRI Source Zones}



LEGEND

★ Center Point of Proposed Bell Bend NPP (BBNPP)

■ City

○ NPP Reactor 200-mile (322 km) Radius

Earthquakes by Magnitude, mb (SEE NOTE)

USGS 2001	USGS 2002 to 2007
3.0 - 3.9	3.0 - 3.9
4.0 - 4.9	4.0 - 4.9
5.0 - 5.9	5.0 - 5.9
6.0 - 6.9	
7.0 - 7.9	

NOTE: The 2002 to 2007 seismicity shown in 500-mile (805 km) radius.

Weston Geophysical Sources contributing to 99% of BBNPP Site Hazard

- 1 Charlevoix - La Malbaie Seismic Zone
- 6 Adirondack Mountains
- 8 Clarendon-Linden
- 21 New York Nexus
- 28B Zone of Mesozoic Basin
- 28E Zone of Mesozoic Basin
- 102 Appalachian Plateau Background
- 103 Southern Appalachian Background
- 104 Southern Coastal Plain Background

REFERENCES:
- ESRI, 2007.
- USGS 2007.
- ANSS, 2007.
- EPRI Volume V: Weston Geophysical, 1986.

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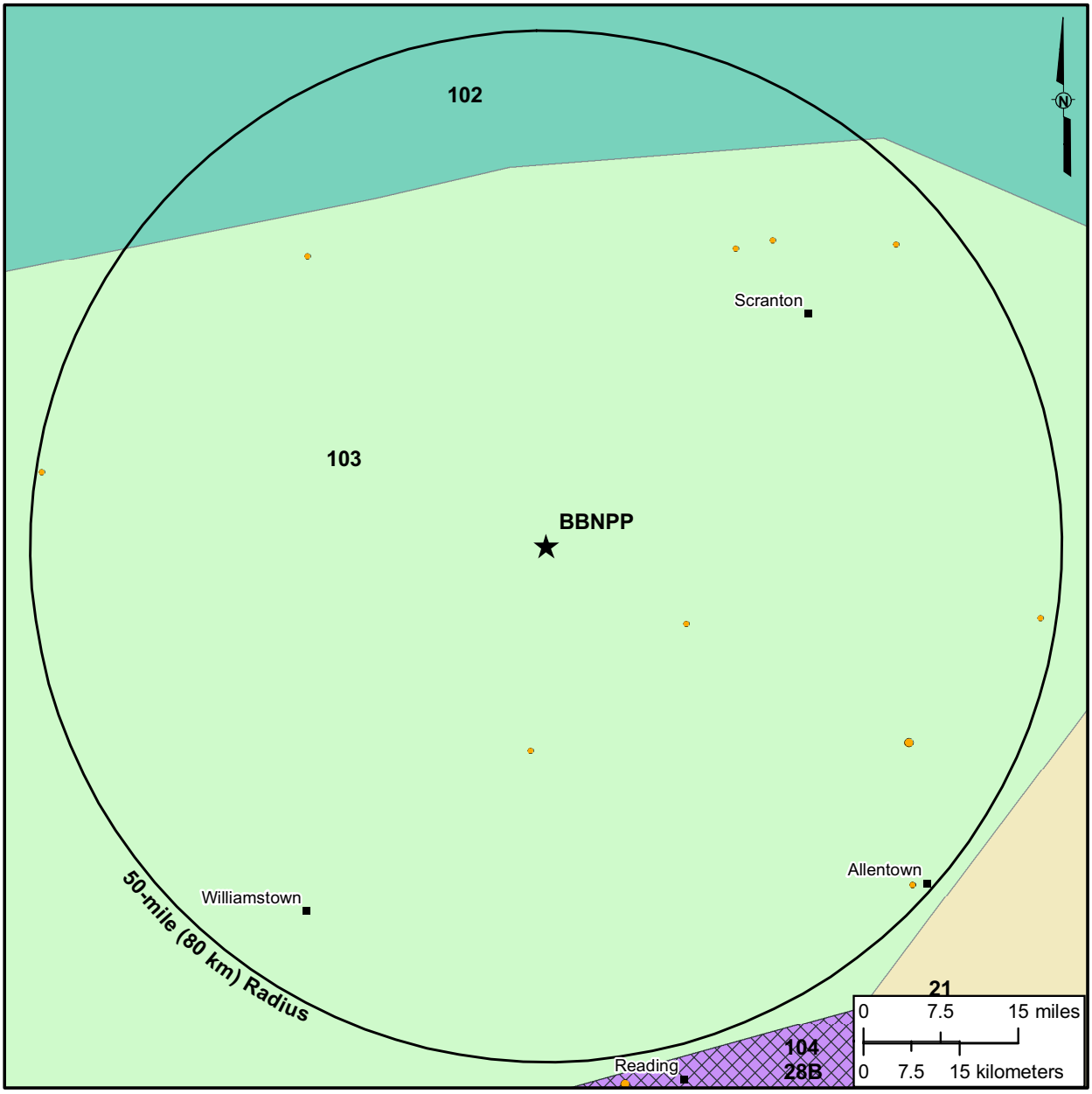
Figure 2.5-40—{Weston Geophysical EPRI Source Zones 50-mile Radius}



LEGEND

★ Center Point of Proposed Bell Bend NPP (BBNPP)

■ City

○ NPP Reactor 50-mile (80 km) Radius

Earthquakes by Magnitude, m_b

USGS 2001	USGS 2002 to 2007
3.0 - 3.9	3.0 - 3.9
4.0 - 4.9	4.0 - 4.9
5.0 - 5.9	5.0 - 5.9
6.0 - 6.9	
7.0 - 7.9	

Weston Geophysical Sources contributing to 99% of BBNPP Site Hazard

- 1 Charlevoix - La Malbaie Seismic Zone
- 6 Adirondack Mountains
- 8 Clarendon-Linden
- 21 New York Nexus
- 28B Zone of Mesozoic Basin
- 28E Zone of Mesozoic Basin
- 102 Appalachian Plateau Background
- 103 Southern Appalachian Background
- 104 Southern Coastal Plain Background

REFERENCES:
- ESRI, 2007.
- USGS 2007.
- ANSS, 2007.
- EPRI Volume V: Weston Geophysical, 1986.

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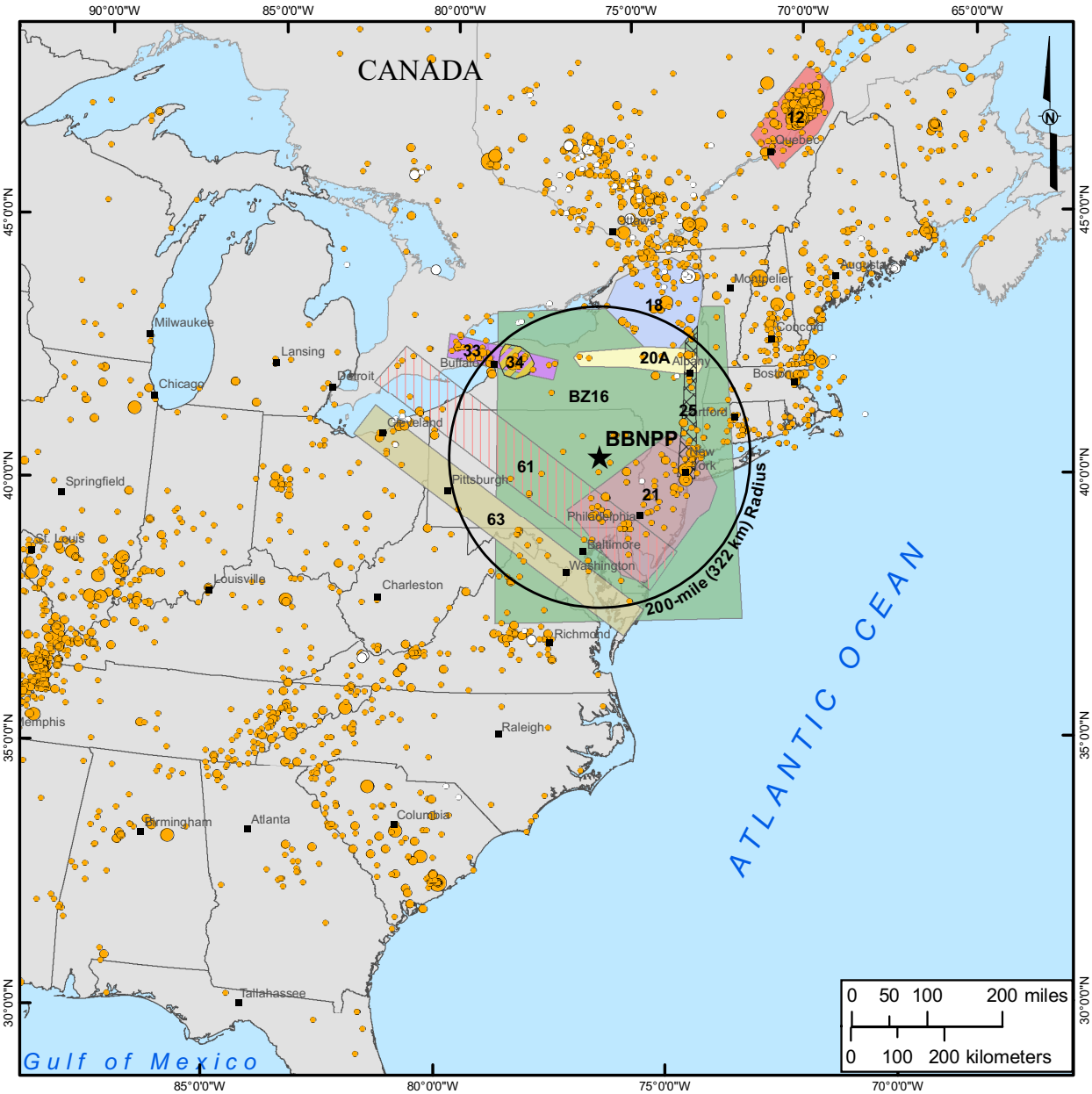
Figure 2.5-41—{Woodward-Consultants EPRI Source Zones}



LEGEND

★ Center Point of Proposed Bell Bend NPP (BBNPP)

■ City

○ NPP Reactor 200-mile (322 km) Radius

Earthquakes by Magnitude, mb (SEE NOTE)

USGS 2001	USGS 2002 to 2007
3.0 - 3.9	3.0 - 3.9
4.0 - 4.9	4.0 - 4.9
5.0 - 5.9	5.0 - 5.9
6.0 - 6.9	
7.0 - 7.9	

NOTE: The 2002 to 2007 seismicity shown in 500-mile (805 km) radius.

Woodward-Clyde Sources contributing to 99% of BBNPP Site Hazard

- 18 Adirondack Uplift
- 20A Mohawk River Trend
- 21 NJ Isostatic Gravity Saddle
- 25 Hudson River Valley Trend
- 33 W. NY-S Ontario Trend
- 34 Attica, NY Intersection
- 63 Pittsburgh - Washington Lineament
- BZ16 Susquehanna Background
- 12 Charlevoix Seismic Zone
- 61 Tyrone - Mt. Union Lineament

REFERENCES:
- ESRI, 2007.
- USGS 2007.
- ANSS, 2007.
- EPRI Volume VIII: Woodward-Clyde Consultants, 1986.

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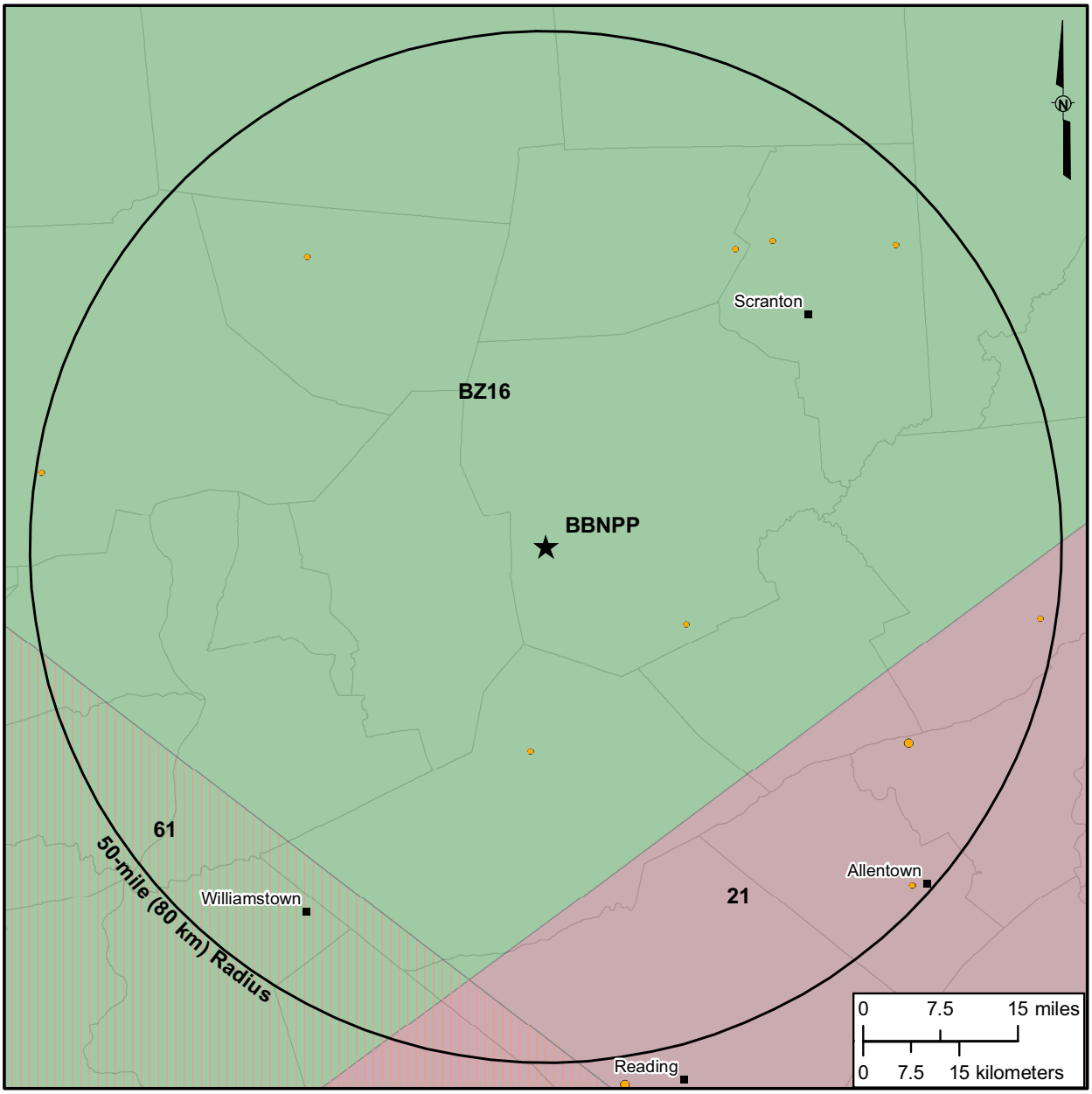
Figure 2.5-42—{Woodward-Clyde Consultants EPRI Source Zones 50-mile Radius}



LEGEND

★ Center Point of Proposed Bell Bend NPP (BBNPP)

■ City

○ NPP Reactor 50-mile (80 km) Radius

Earthquakes by Magnitude, m_b

USGS 2001	USGS 2002 to 2007
3.0 - 3.9	3.0 - 3.9
4.0 - 4.9	4.0 - 4.9
5.0 - 5.9	5.0 - 5.9
6.0 - 6.9	
7.0 - 7.9	

Woodward-Clyde Sources contributing to 99% of BBNPP Site Hazard

- 18 Adirondack Uplift
- 20A Mohawk River Trend
- 21 NJ Isostatic Gravity Saddle
- 25 Hudson River Valley Trend
- 33 W. NY-S Ontario Trend
- 34 Attica, NY Intersection
- 63 Pittsburgh - Washington Lineament
- BZ16 Susquehanna Background
- 12 Charlevoix Seismic Zone
- 61 Tyrone - Mt. Union Lineament

REFERENCES:
- ESRI, 2007.
- USGS 2007.
- ANSS, 2007.
- EPRI Volume VIII: Woodward-Clyde Consultants, 1986.

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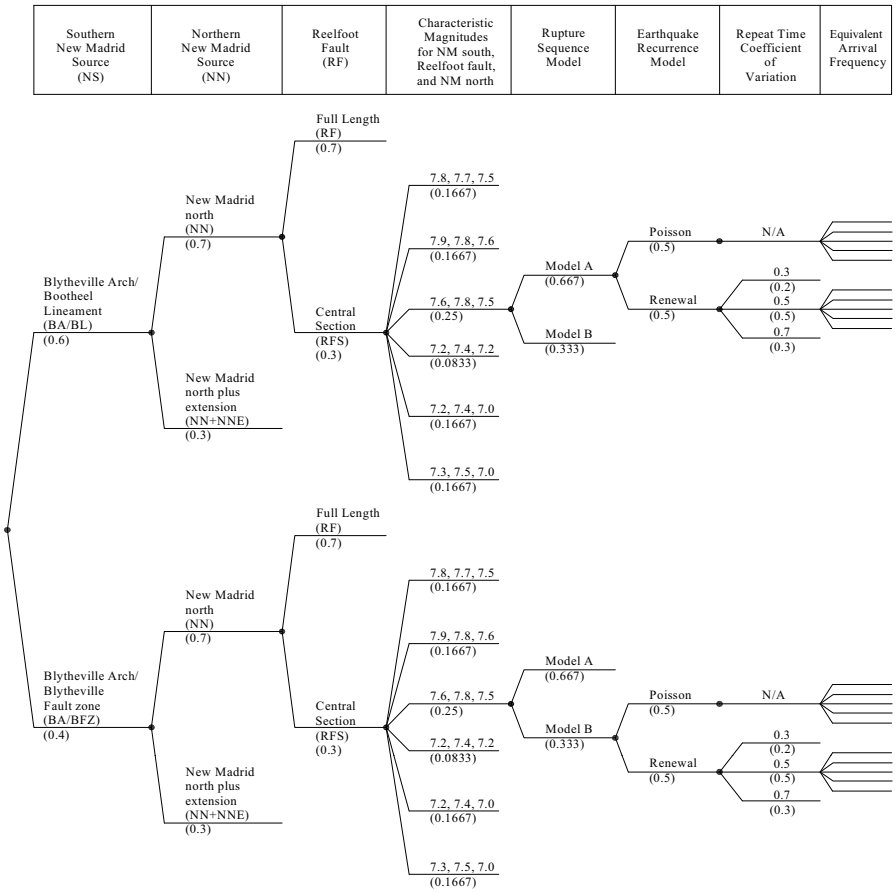
Figure 2.5-43—{Logic Tree of New Madrid Fault System}



Adapted from the Seismic Hazards Report for the Clinton ESP Site .
See Figure 4.1-1 of Appendix B (EGC 2006)

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Figure 2.5-44—{Uniform Hazard Spectra for Hard Rock at 7 Structural Frequencies}

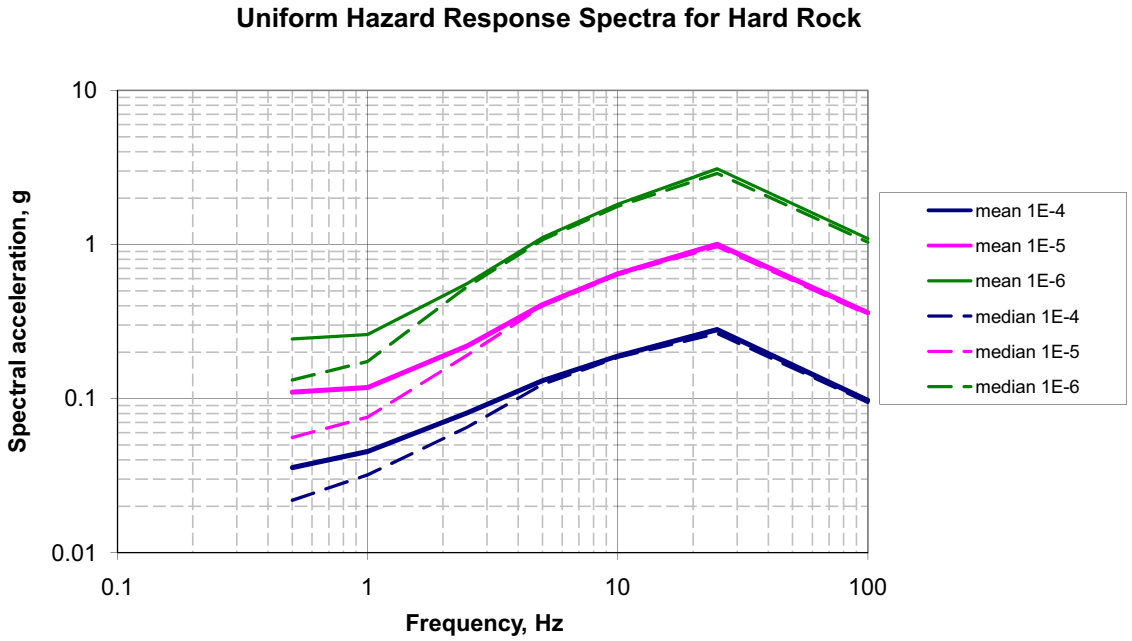

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Figure 2.5-45—{Mean 10-4 Rock Deaggregation for 1 and 2.5 Hz}

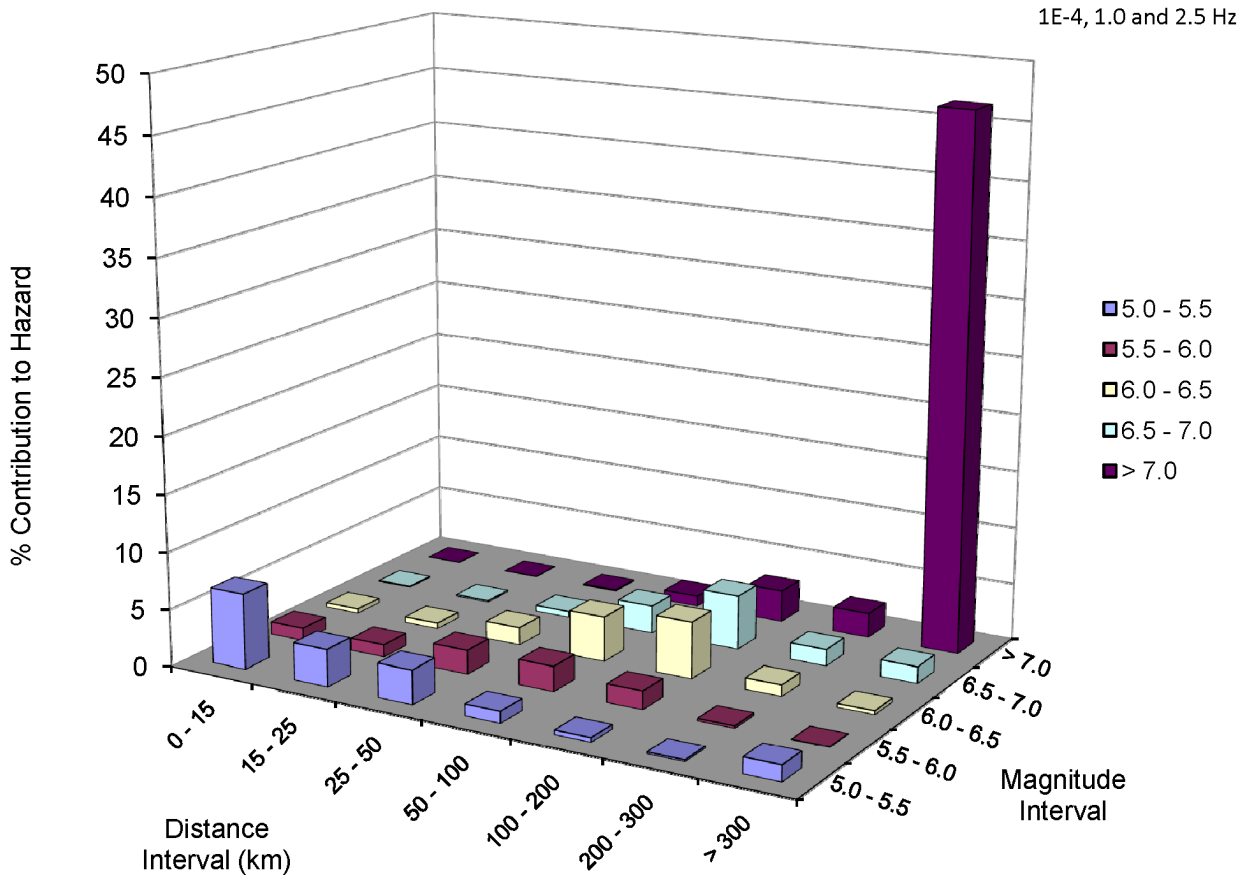

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Figure 2.5-46—{Mean 10-4 Rock Deaggregation for 5 and 10 Hz}

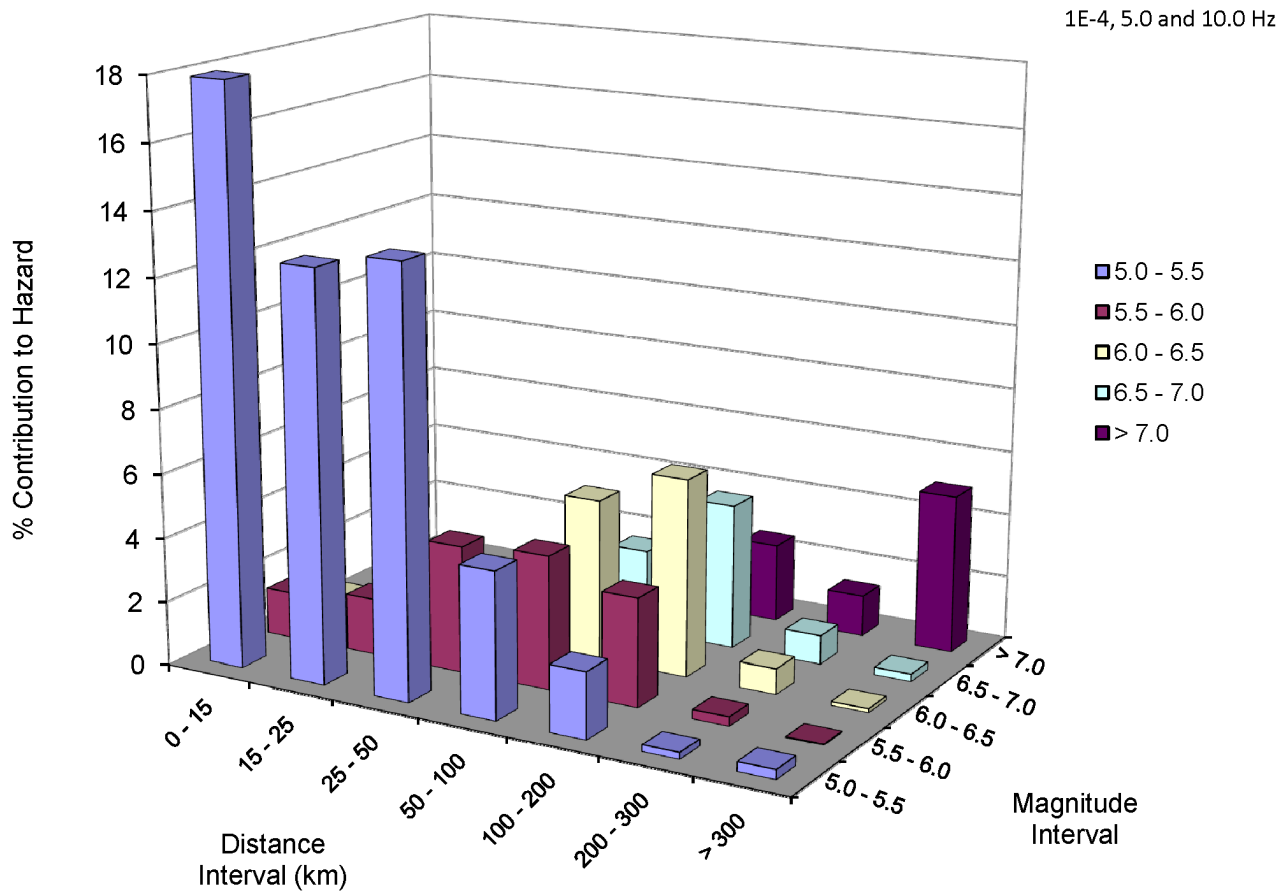

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Figure 2.5-47—{Mean 10-5 Rock Deaggregation for 1 and 2.5 Hz}

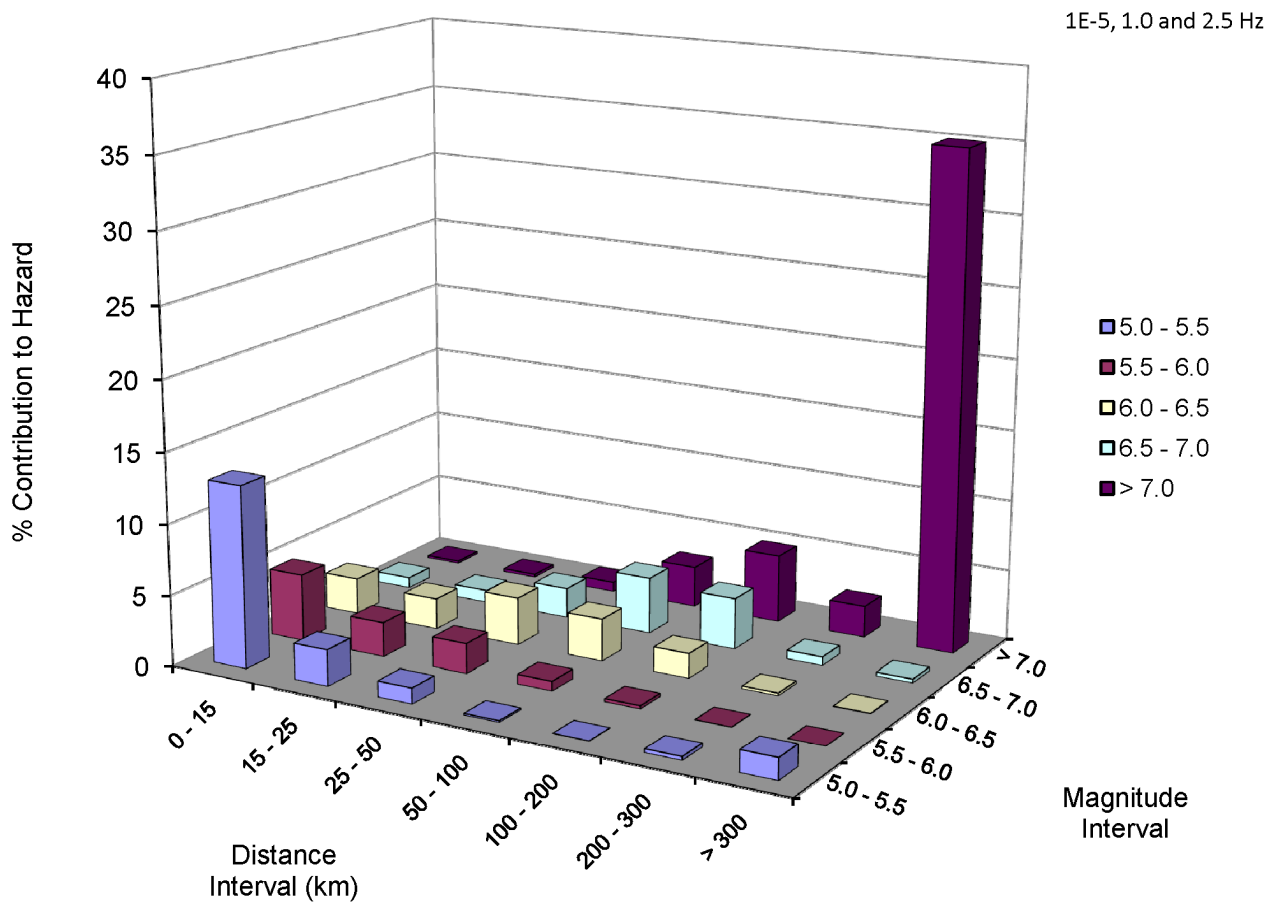

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Figure 2.5-48—{Mean 10-5 Rock Deaggregation for 5 and 10 Hz}

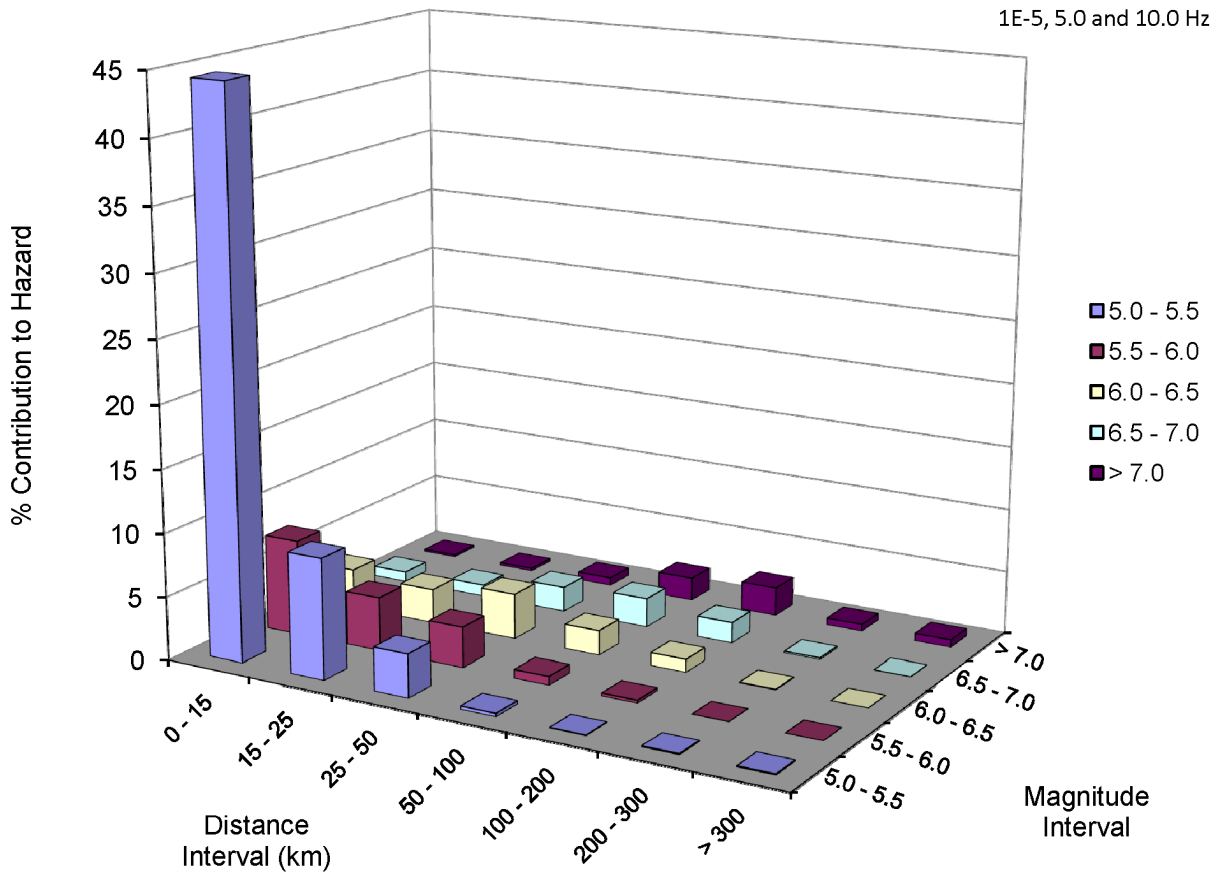

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Figure 2.5-49—{Smooth Hard Rock UHRS Spectra}

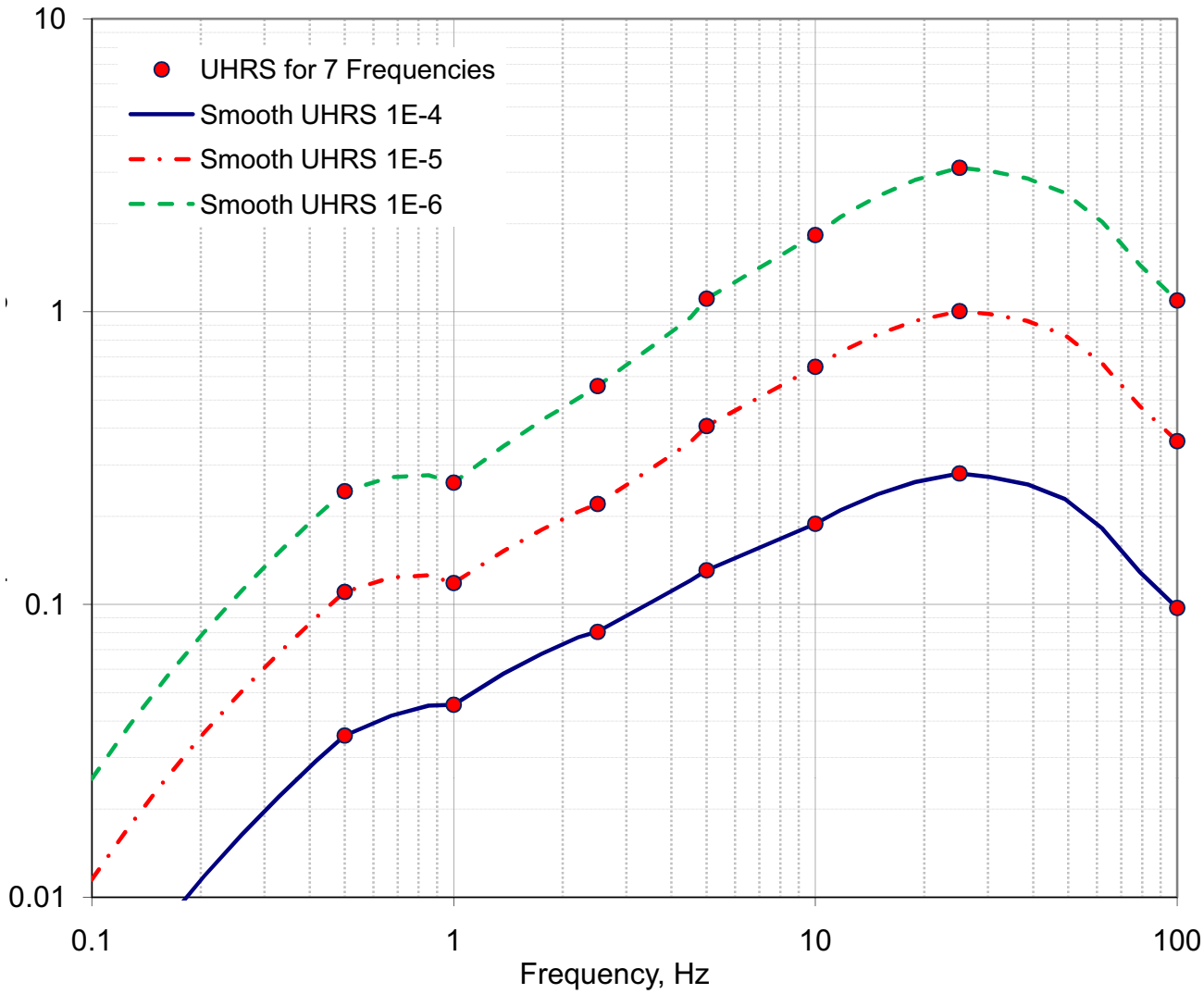

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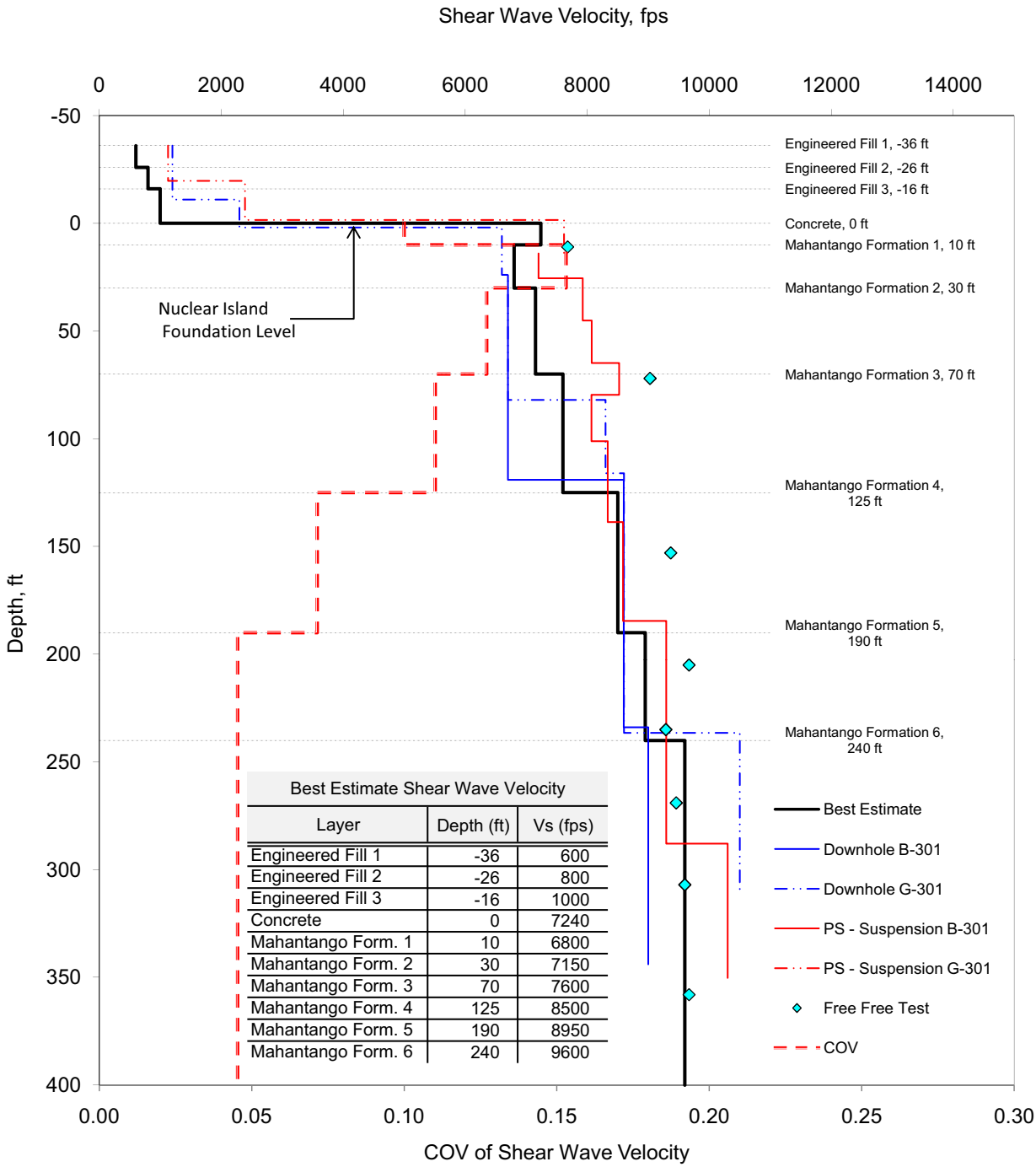
Figure 2.5-50—{Shear-Wave Velocity Vs and its Coefficient of Variation for Depth to 350 ft (107m)}



Best Estimate Shear Wave Velocity

Layer	Depth (ft)	Vs (fps)
Engineered Fill 1	-36	600
Engineered Fill 2	-26	800
Engineered Fill 3	-16	1000
Concrete	0	7240
Mahantango Form. 1	10	6800
Mahantango Form. 2	30	7150
Mahantango Form. 3	70	7600
Mahantango Form. 4	125	8500
Mahantango Form. 5	190	8950
Mahantango Form. 6	240	9600

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Figure 2.5-51—{Best Estimate Shear-Wave Velocity Vs and its Coefficient of Variation for Depth to 190 ft (57.9 m)}

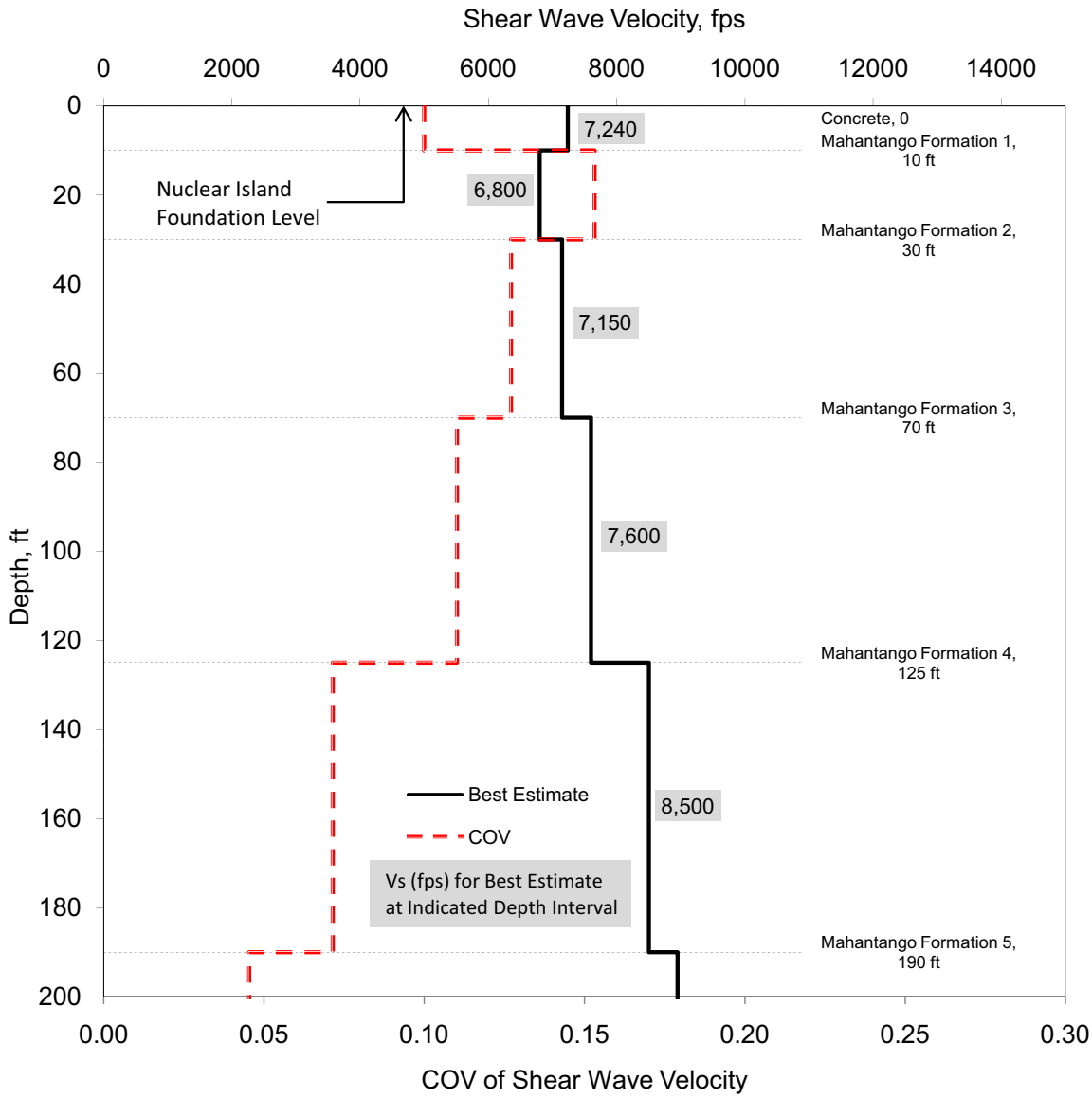

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Figure 2.5-52—{Shear-wave Velocity Vs. Depth for Profiles 1 through 60}

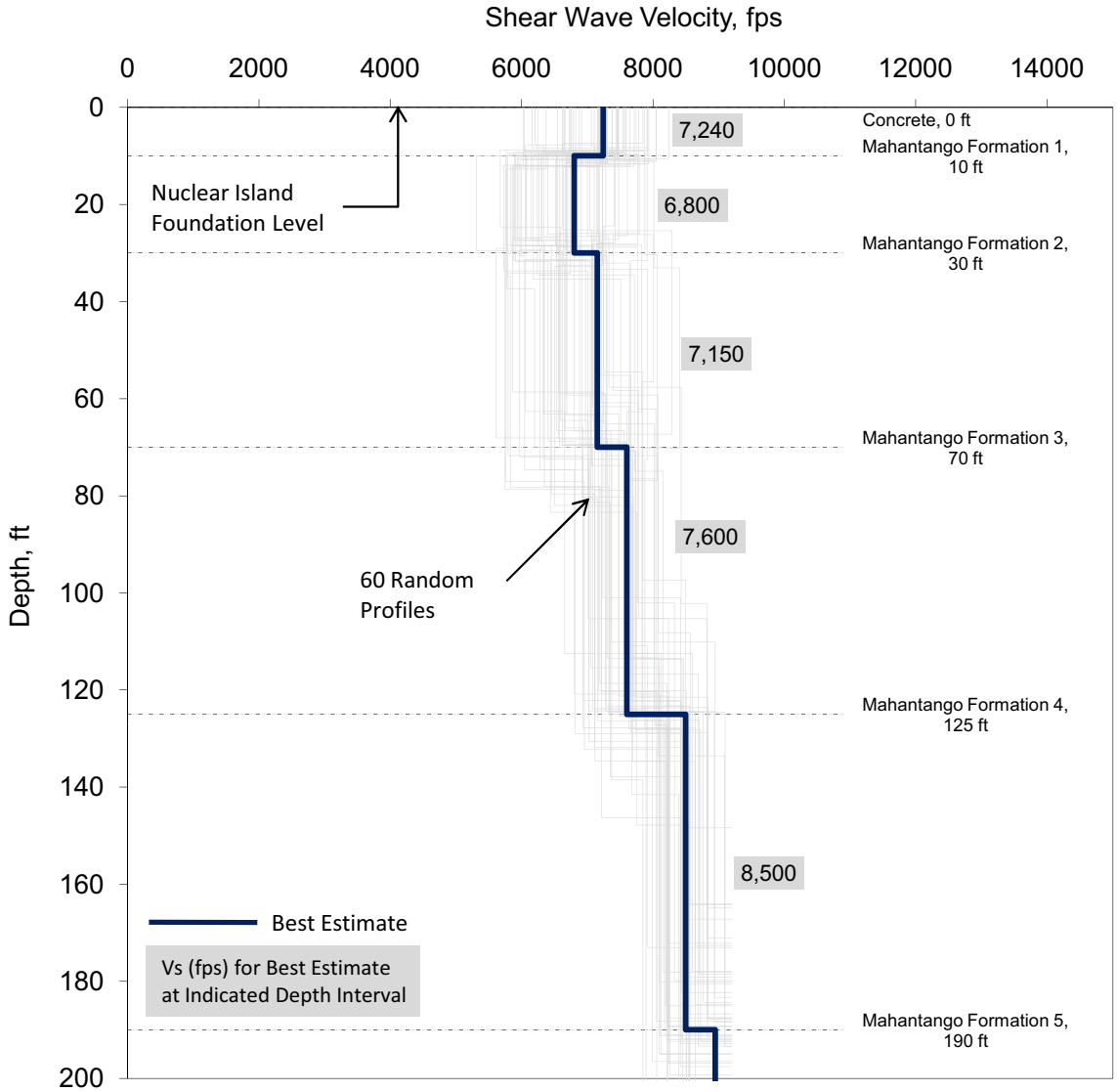

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Figure 2.5-53—{Mean + Standard Deviation of Shear-wave Velocity (Vs) Vs. Depth for all 60 profiles, Compared to Best Estimate Profile described in Section 2.5.2.5.1.2}

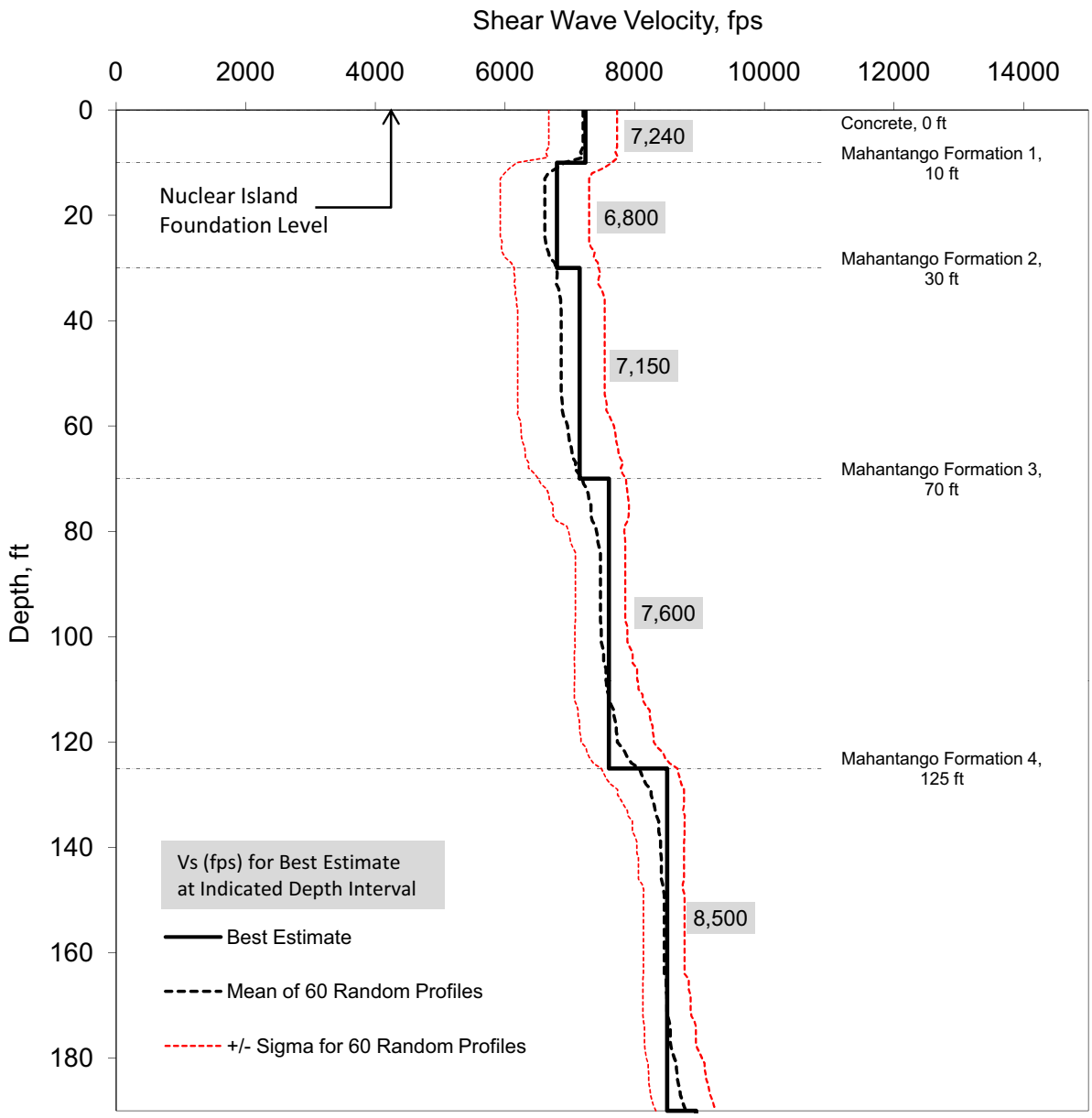

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Figure 2.5-54—{G/Gmax Curves Representing Uncertainty in Damping for Layer Backfill within Depth 0-20ft}

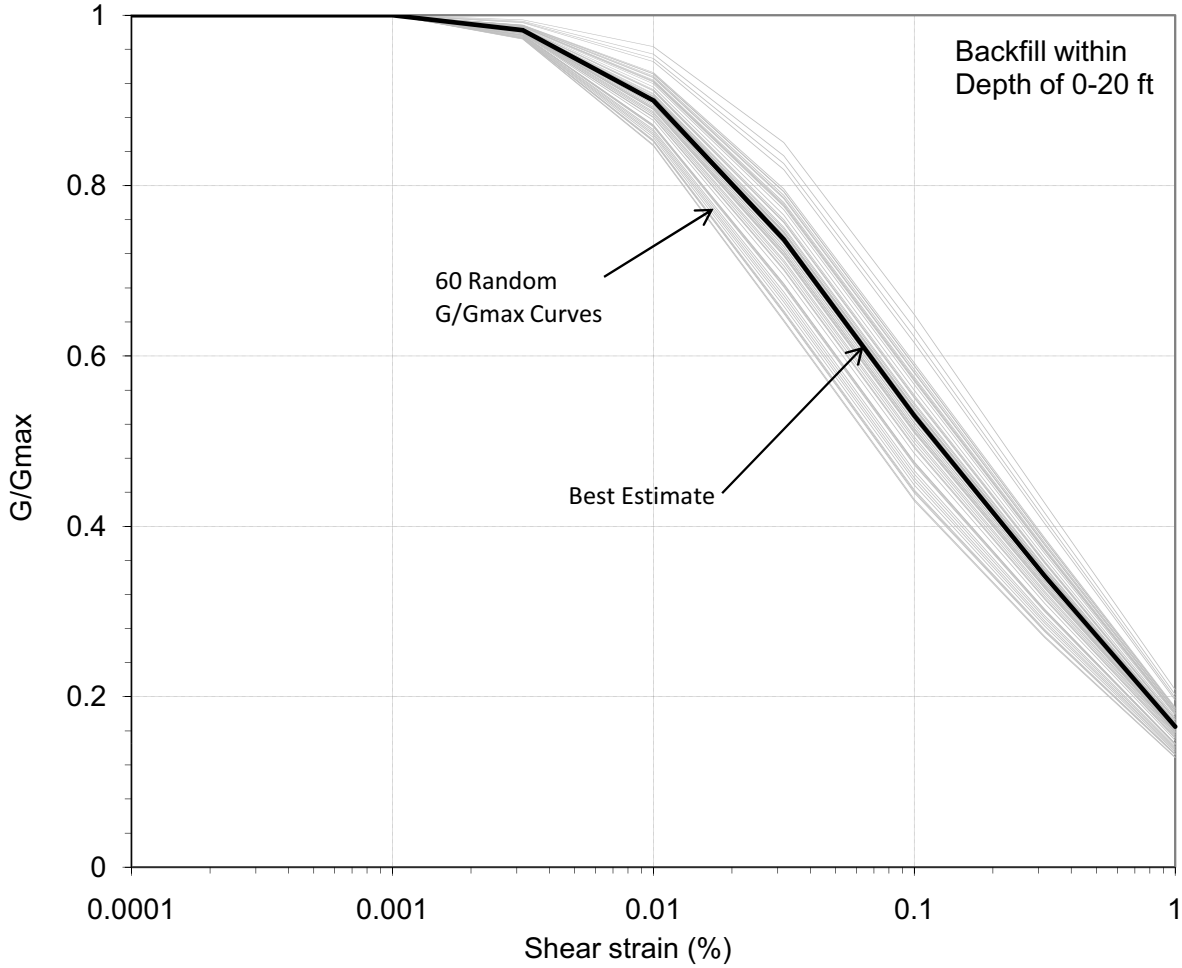

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Figure 2.5-55—{Damping Curves Representing Uncertainty in Damping for Layer Backfill within Depth 0-20 ft}

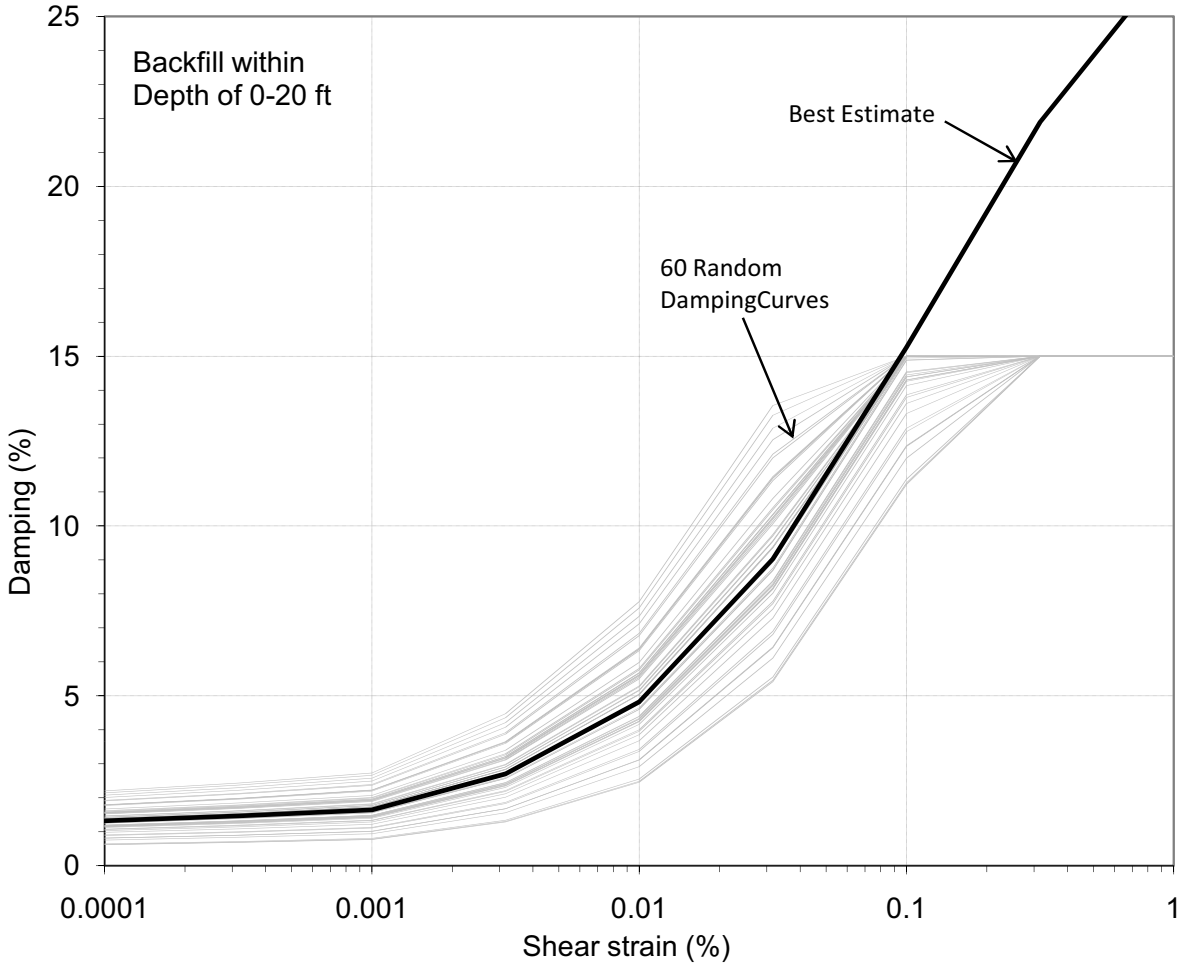

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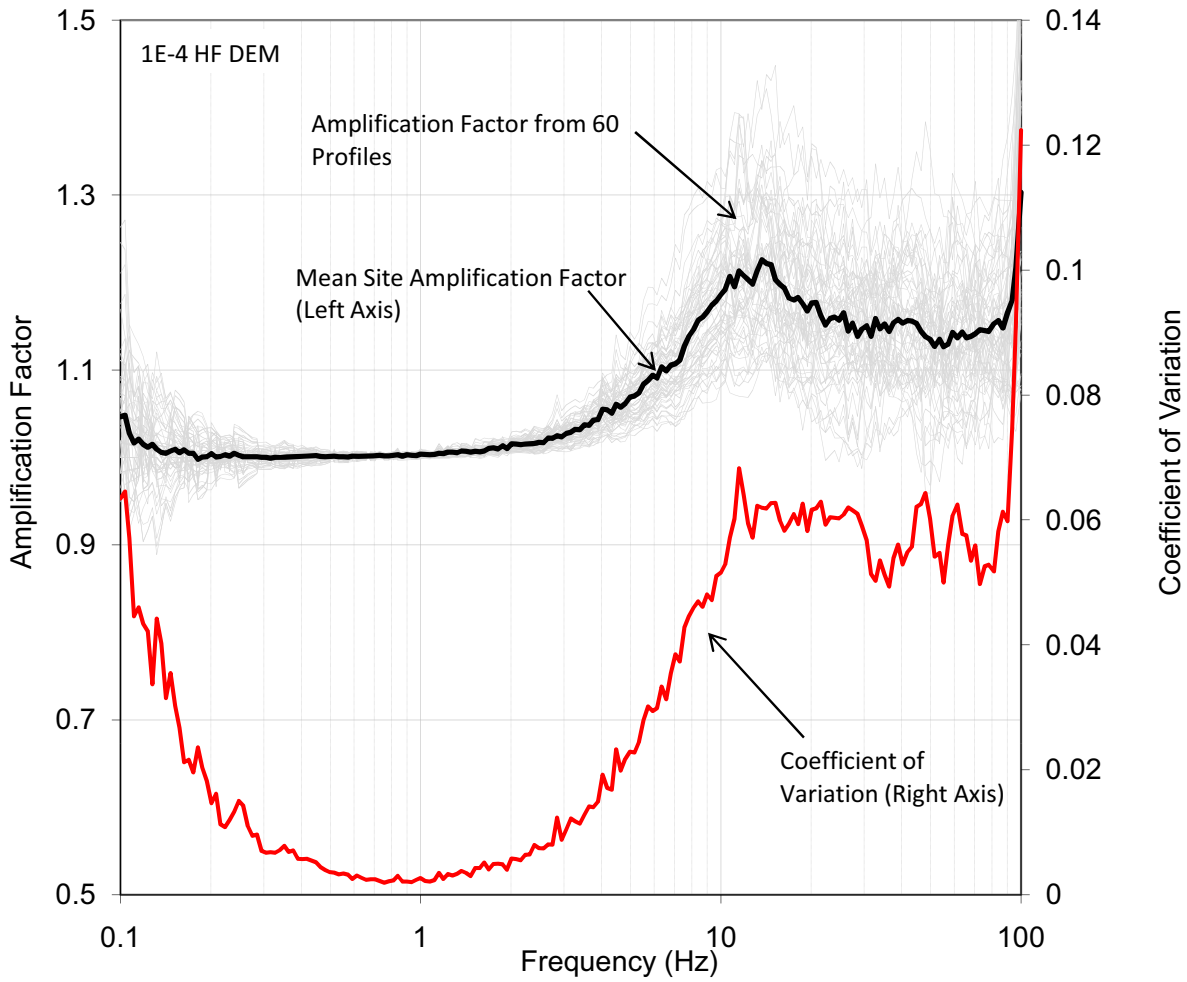
Figure 2.5-56—{Mean Site Amplification Factor and Coefficient of Variation at the Top of Concrete for 10-4 HF DEM Input Motion}



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