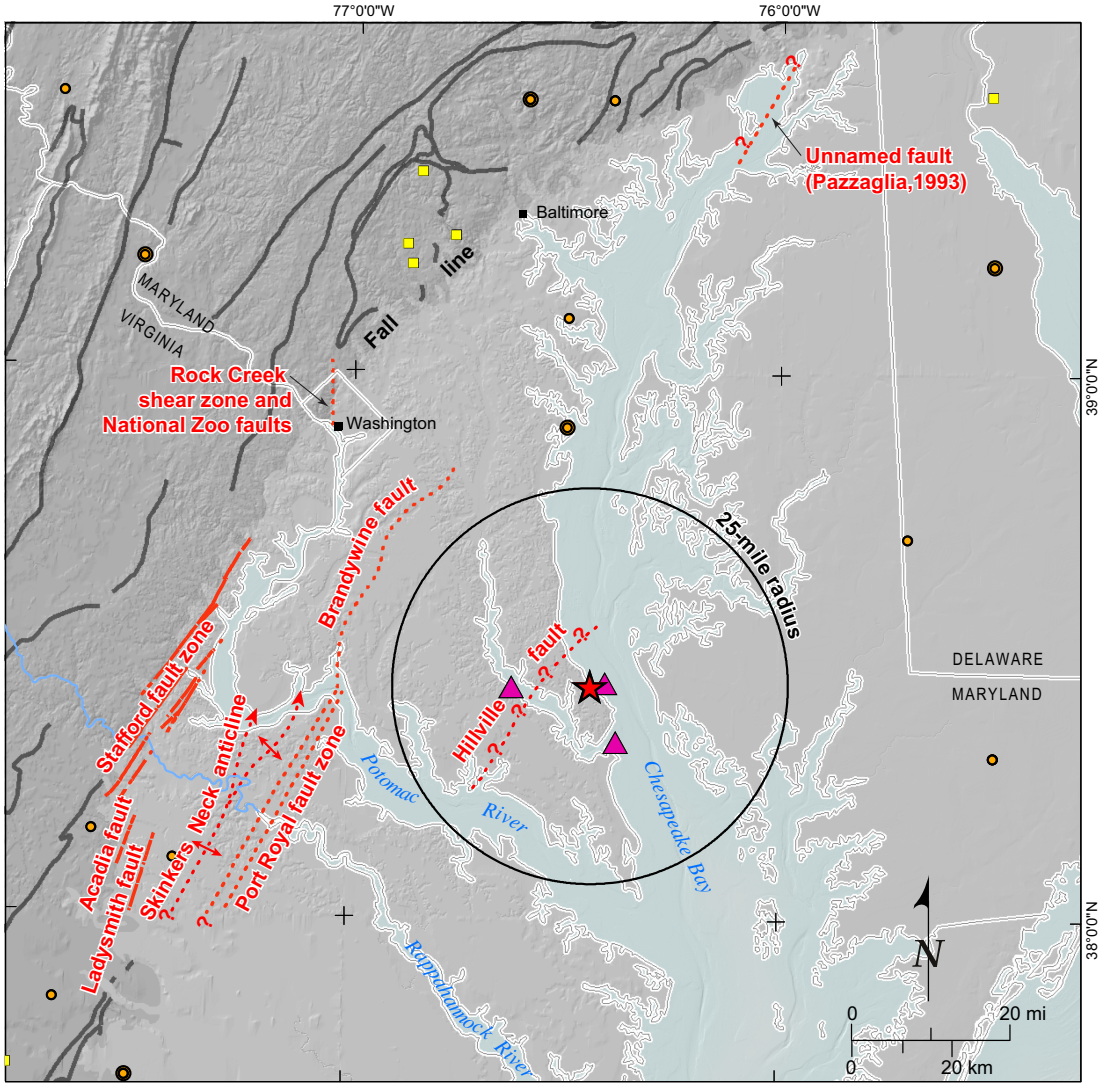
Figure 2.5-25—{Map of Tertiary Tectonic Features}



Explanation

CCNPP site

McCartan et al. (1995) features (inferred monoclines)

Tertiary fault; dashed where uncertain; dotted where buried

Pre-Tertiary fault (Hibbard et al., 2006)

Anticline

Physiographic Provinces

Coastal Plain

Piedmont

Earthquake Epicenters (by magnitude, Emb)

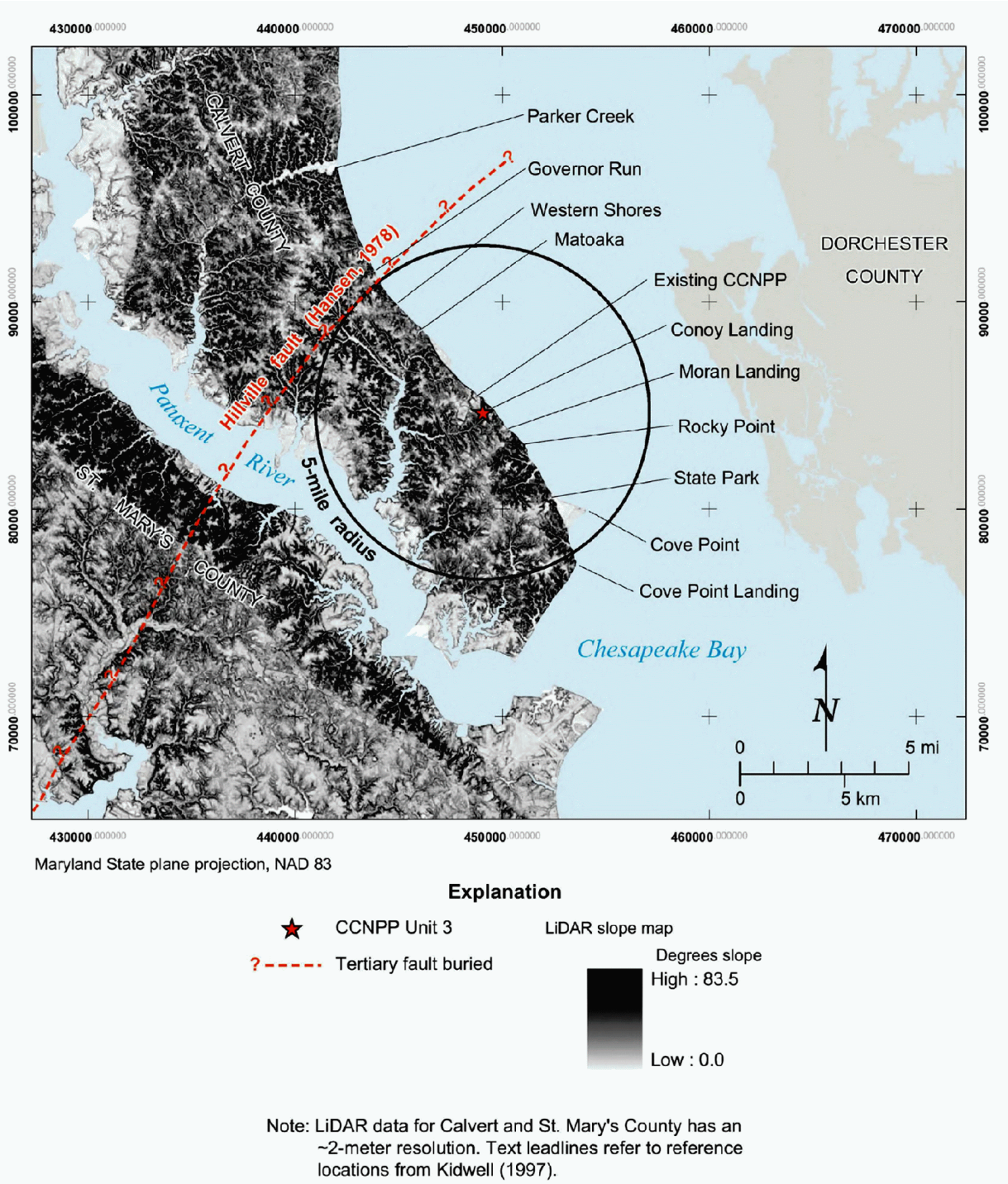
EPRI catalog (1627-1984)	*Eastern U.S. Seismicity (1985-2006)*
3.00 - 3.99	3.00 - 3.99
4.00 - 4.99	4.00 - 4.99
5.00 - 5.99	5.00 - 5.21
6.00 - 6.99	
7.00 - 7.40	

Note: Emb is an equivalent body-wave magnitude explained in Section 2.5.2.1.

1782 Rev. 3 03.17.09

© 2007 UniStar Nuclear Services, LLC. All rights reserved.
COPYRIGHT PROTECTED

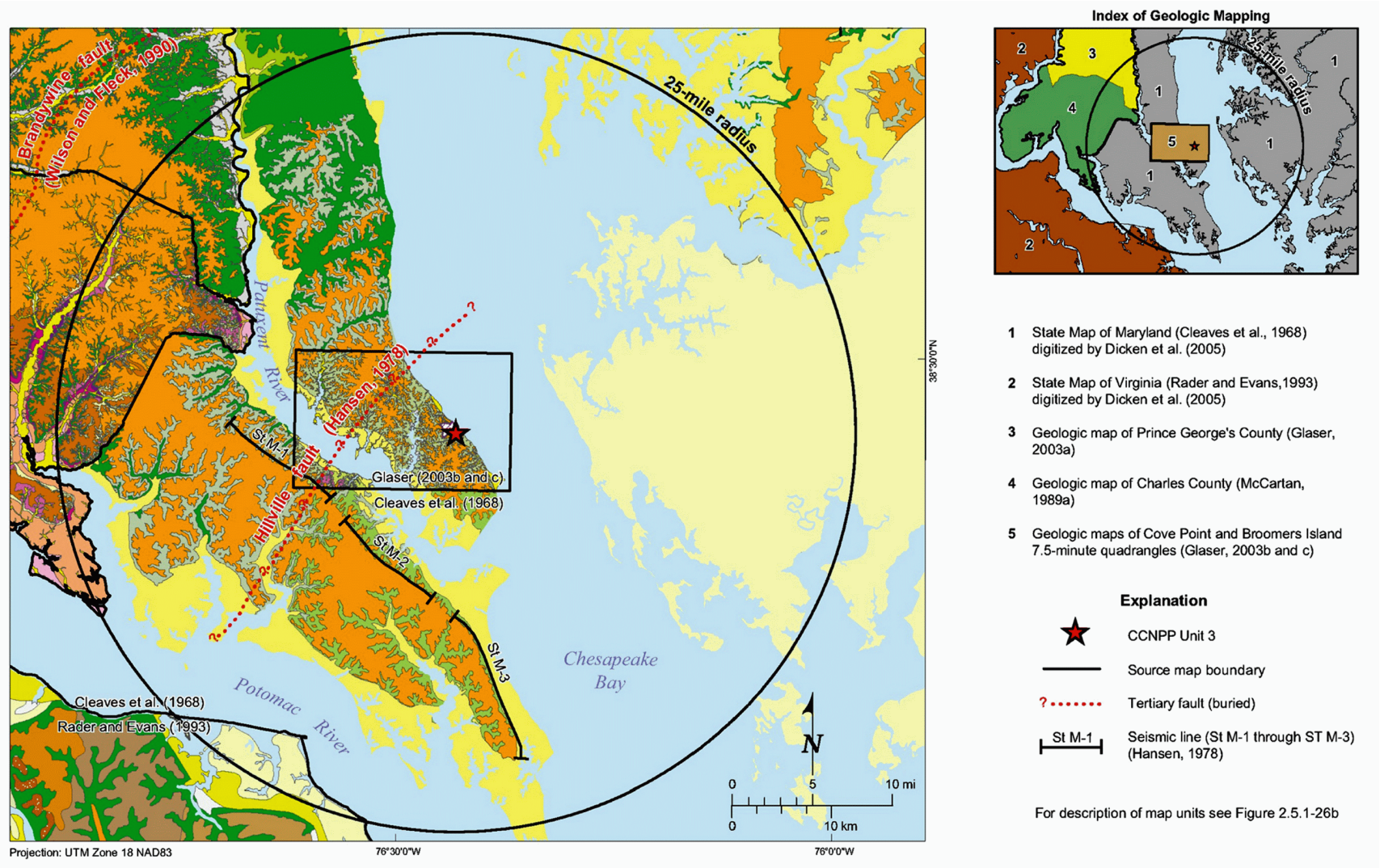
Figure 2.5-26—{LiDAR Data for Calvert and St. Mary's Counties}



Note: LiDAR data for Calvert and St. Mary's County has an ~2-meter resolution. Text leadlines refer to reference locations from Kidwell (1997).

© 2007 UniStar Nuclear Services, LLC. All rights reserved.
COPYRIGHT PROTECTED

Figure 2.5-27—{Site Vicinity Geologic Map 25-Mile (40-Km) Radius}



© 2007 UniStar Nuclear Services, LLC. All rights reserved.
COPYRIGHT PROTECTED

Figure 2.5-28—{Site Vicinity Geologic Map 25-Mile (40-Km) Radius Unit Descriptions}

Explanation

Maryland (Cleaves, et al., 1968)

- Quaternary, Pleistocene to recent: Qcu — Quaternary undivided - sand
- Ql — Lowland deposits - gravel
- Qu — Upland deposits (Eastern Shore) - gravel
- Pliocene(?): QTu — Quaternary and Tertiary deposits (undifferentiated) - gravel

Chesapeake Group

- Miocene: Ts — St. Marys Formation - clay
- Tch — Choptank Formation - sand
- Tc — Calvert Formation - sand
- Eocene: Tn — Nanjemoy Formation - sand
- Paleocene: Ta — Aquia Formation - sand

Virginia (Rader and Evans, 1993)

- Quaternary: sb — Beach and dune sand deposits
- al — Quaternary, alluvium
- Qtp — Lynnhaven and Poquoson members undifferentiated (Tabb Formation) - sand
- Qtl — Lynnhaven Member (Tabb Formation) - sand
- Qts — Sedgefield member (Tabb Formation) - sand
- QTu — Tertiary-Quaternary deposits undifferentiated - sand
- Qsh — Shirely Formation (Omar Fm equivalent) - gravel
- Qcc — Charles City Formation - sand
- Pliocene: Tm — Moorings unit of Oaks and Coch (1973) - sand
- Tb1 — Bacons Castle Formation - gravel
- Tb2 — Bacons Castle Formation - sand
- psg — Pliocene sand and gravel

Chesapeake Group

- Miocene: Tc — Chesapeake group - sand

Prince George's County (Glaser, 2003a)

- Quaternary, Holocene: Qal — Alluvium - interbedded sand silt-clay and subordinate gravel
- Pleistocene: Qt — Terrace deposits (informal unit) - interbedded sand gravel and silt-clay
- Upper Miocene, Pliocene: Tu — Upland deposits (informal unit) - sand pebbly sand and gravel capped by sandy pebbly loam in places

Chesapeake Group

- Lower to Middle Miocene: Tc — Calvert Formation - fine- to very fine-grained sand and silt, as well as diatomaceous silt
- Lower Eocene: Tn — Nanjemoy Formation - clay and minor interbedded silt
- Paleocene: Tm — Marlboro clay, clay or silty clay; sparse lenses silt
- Ta — Aquia Formation, sand (variably glauconitic)

Charles County (McCartan, 1989a)

- Quaternary, Holocene: Qh — Holocene deposits undivided - sand gravel silt and clay
- Czcu — Cenozoic colluvium undivided - clay to cobble-sized material; poorly sorted
- Pleistocene: Qk — Kent Island Formation - silty sand (fine-to medium-grained)
- Qm — Maryland Point Formation - sand, silty clay, and clay
- Qo — Omar Formation - mud and muddy fine sand grading downward to fine gravel
- Qcx — Chicamuxen Church Formation - silty clay and muddy fine sand grading downward to pebbly mud and sand
- Pliocene: Tp — Park Hall Formation, silty sand, sand, and clay interbedded with coarse sand, pebbles, and boulders
- Tug4 — Upland gravel 4, sand; lenses of muddy sand and clay grading downward to gravelly mud or coarse sand
- Tug3 — Upland gravel 3 - mainly interbedded sand and gravel with coarse sand matrix

Chesapeake Group

- Middle Miocene: Tch — Choptank Formation - fine sand to silty sand interbedded with silty clay
- Tc — Calvert Formation - very fine sand and fine sandy clay; rare medium to coarse sand
- Lower Eocene: Tn — Nanjemoy Formation - glauconitic sand (fine- to med-grained) and silty clay
- Tm — Marlboro clay, clay and minor interbedded silt
- Ta — Aquia Formation, micaceous glauconitic sand (fine- to coarse-grained)

Broomers Island and Cove Point Quadrangles (modified from Glaser, 2003 b and c)

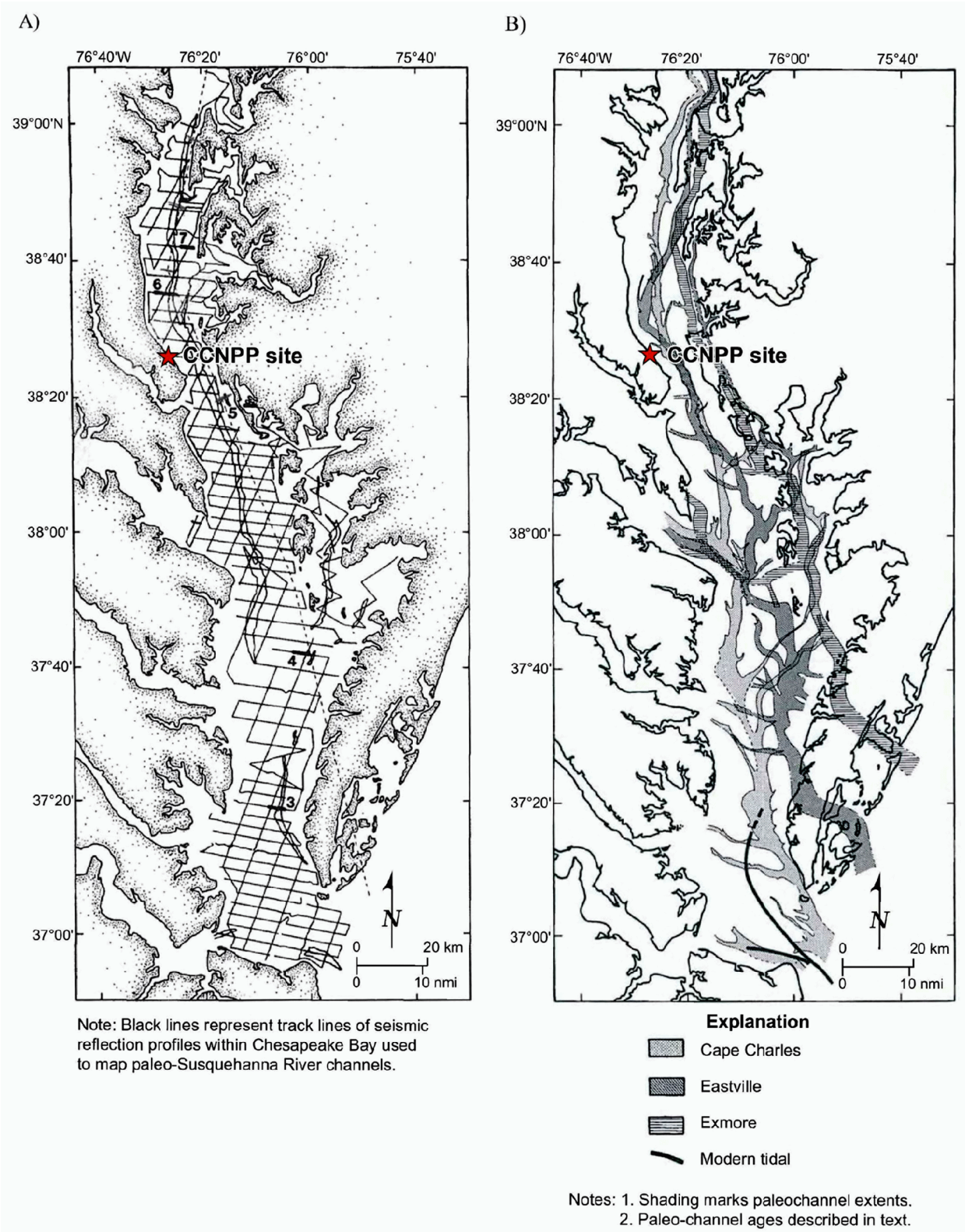
- Quaternary, Holocene: af — Artificial fill - heterogeneous unstratified materials, such as sand, gravel, clay, slag, construction debris, and dredge spoil
- Qal — Alluvium - interbedded sand, gravel, and silt-clay; organic matter in places; rare thin peats
- Qb — Holocene beach deposits - loose, cross stratified sand and marshes
- Qz — Lowland deposits (informal unit) - interbedded sand, silt-clay and minor pebbly sand; fossiliferous in places; thin gravels at base
- Pleistocene: Qcx — Chicamuxen Church formation - interbedded sand and gravel; uppermost 4 to 5 feet consist of silty clay or silty fine sand
- Qt — Terrace deposits (informal unit) - sand and gravel
- Pliocene: Tp — Park Hall Formation - interbedded sand and minor clay-silt and pebbly sand and gravel
- Tu — Upland deposits (informal unit) - sand, gravel and minor clay-silt

Chesapeake Group

- Middle Miocene: Tcsm — Choptank and St. Marys Formations undivided - sand, sandy clay and clay; variably fossiliferous
- Tcp — Calvert Formation, Plum Point marls - sand and clayey sand; fossiliferous at several horizons yet sparingly fossiliferous throughout
- Tcf — Calvert Formation, Fairhaven member - sand and diatomaceous silt with clay - diatomaceous silt in lower portion; homogeneous sand and silty sand in upper portion (mapped in subsurface only)

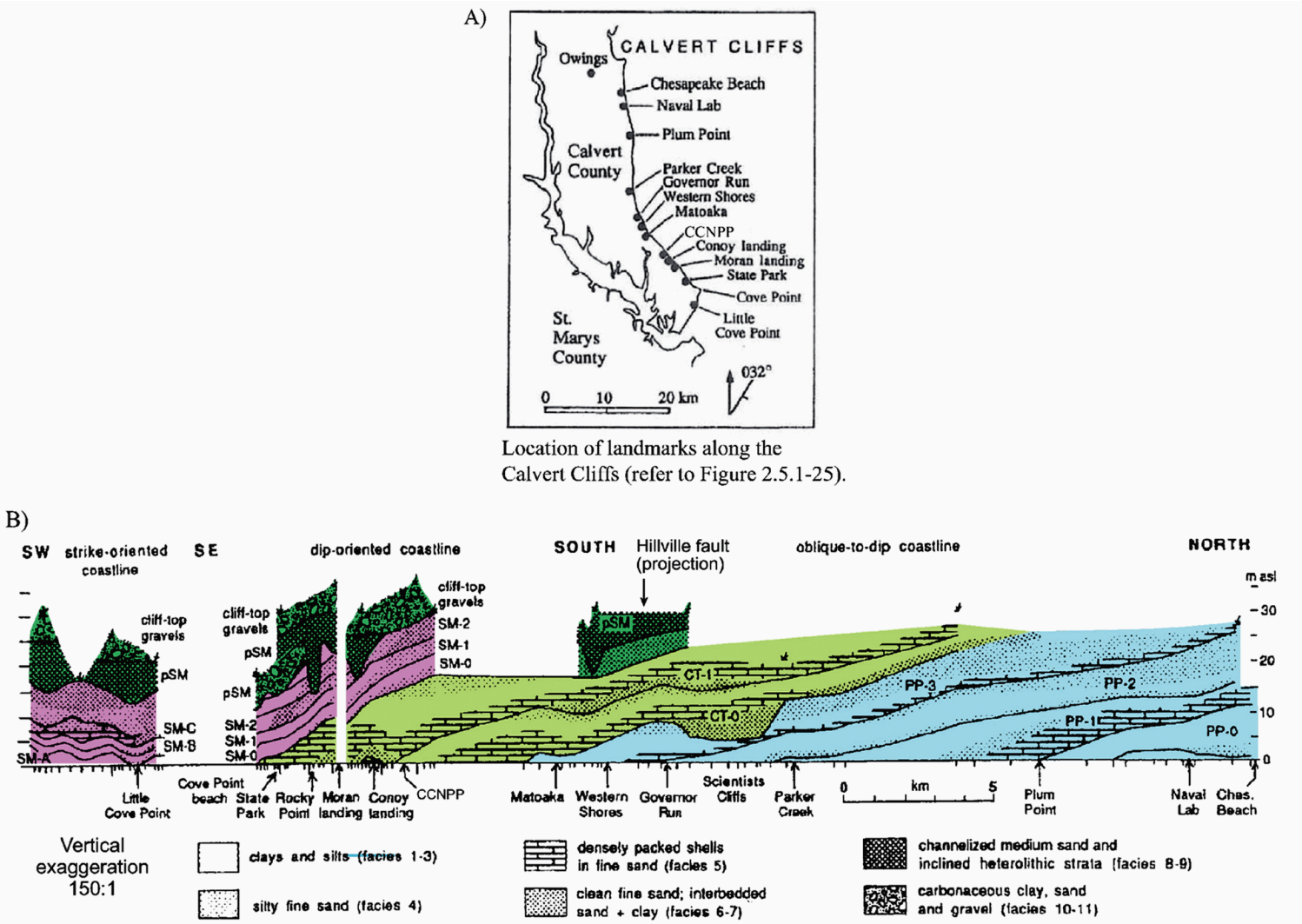
© 2007 UniStar Nuclear Services, LLC. All rights reserved.
COPYRIGHT PROTECTED

Figure 2.5-29—{Map of Seismic Lines (A) and Channels (B)}



© 2007 UniStar Nuclear Services, LLC. All rights reserved.
COPYRIGHT PROTECTED

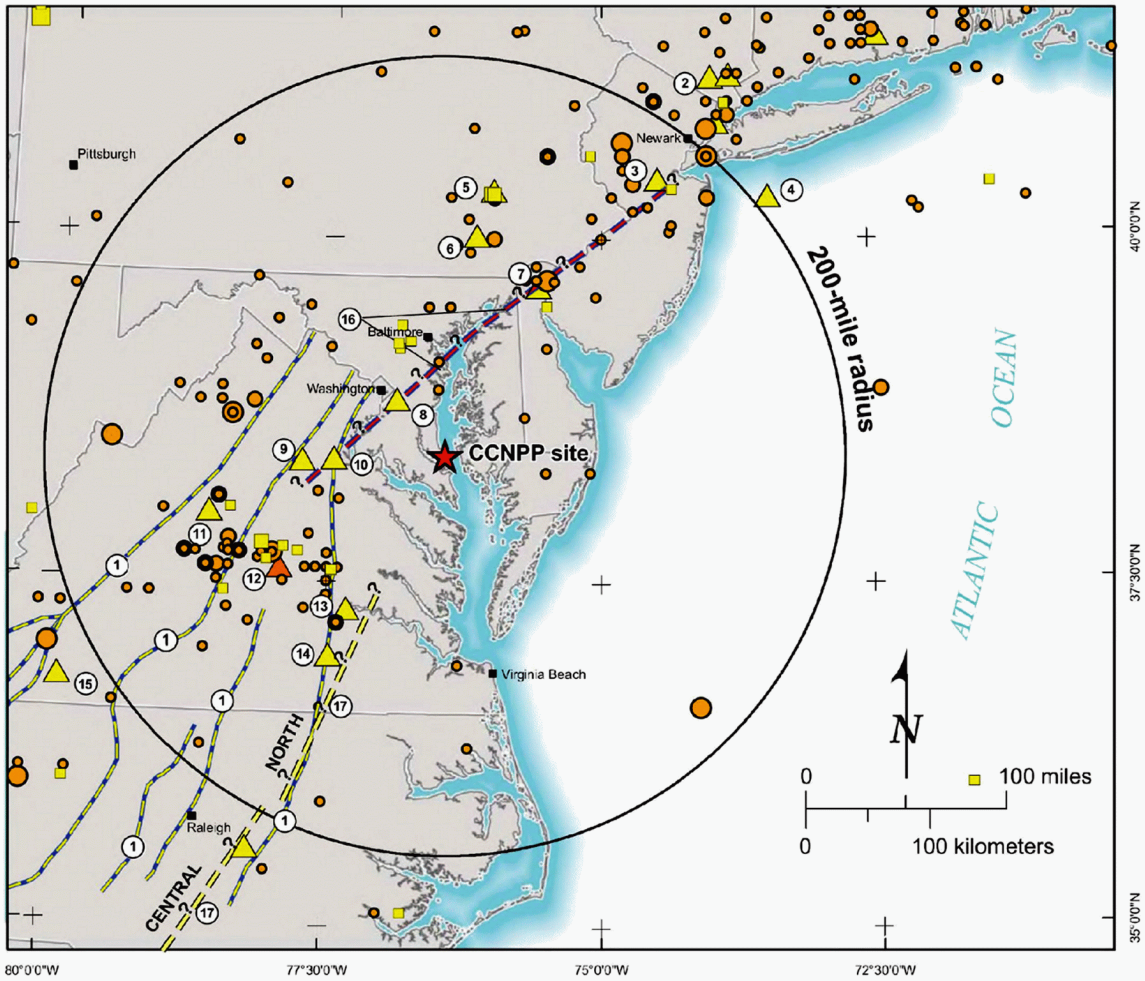
Figure 2.5-30—{Location Map (A) and Cross Section (B) of Calvert Cliffs, Maryland}



Cross section of the Calvert Cliffs showing disconformity-bounded units. PP, Plum Point Member of the Calvert Formation; CT, Choptank Formation; SM, St. Marys Formation; pSM, post-St. Mary's Neogene strata.

© 2007 UniStar Nuclear Services, LLC. All rights reserved.
COPYRIGHT PROTECTED

Figure 2.5-31—{Potential Quaternary Features in the Site Region}



Explanation

Features* compiled from Crone and Wheeler (2000) and Wheeler (2005)

Class

- A
- C
- C East coast fault system (Marple and Talwani, 2000)
- C Weems fall lines (1998) (Marple, 2004)
- C Stafford fault system (Marple, 2004)

Earthquake Epicenters (by magnitude, Emb)

EPRI Catalog (1627 - 1984)	*Eastern U.S. Seismicity (1985 - 2006)*
3.00 - 3.99	3.00 - 3.99
4.00 - 4.99	4.00 - 4.99
5.00 - 5.99	5.00 - 5.21
6.00 - 6.99	
7.00 - 7.49	

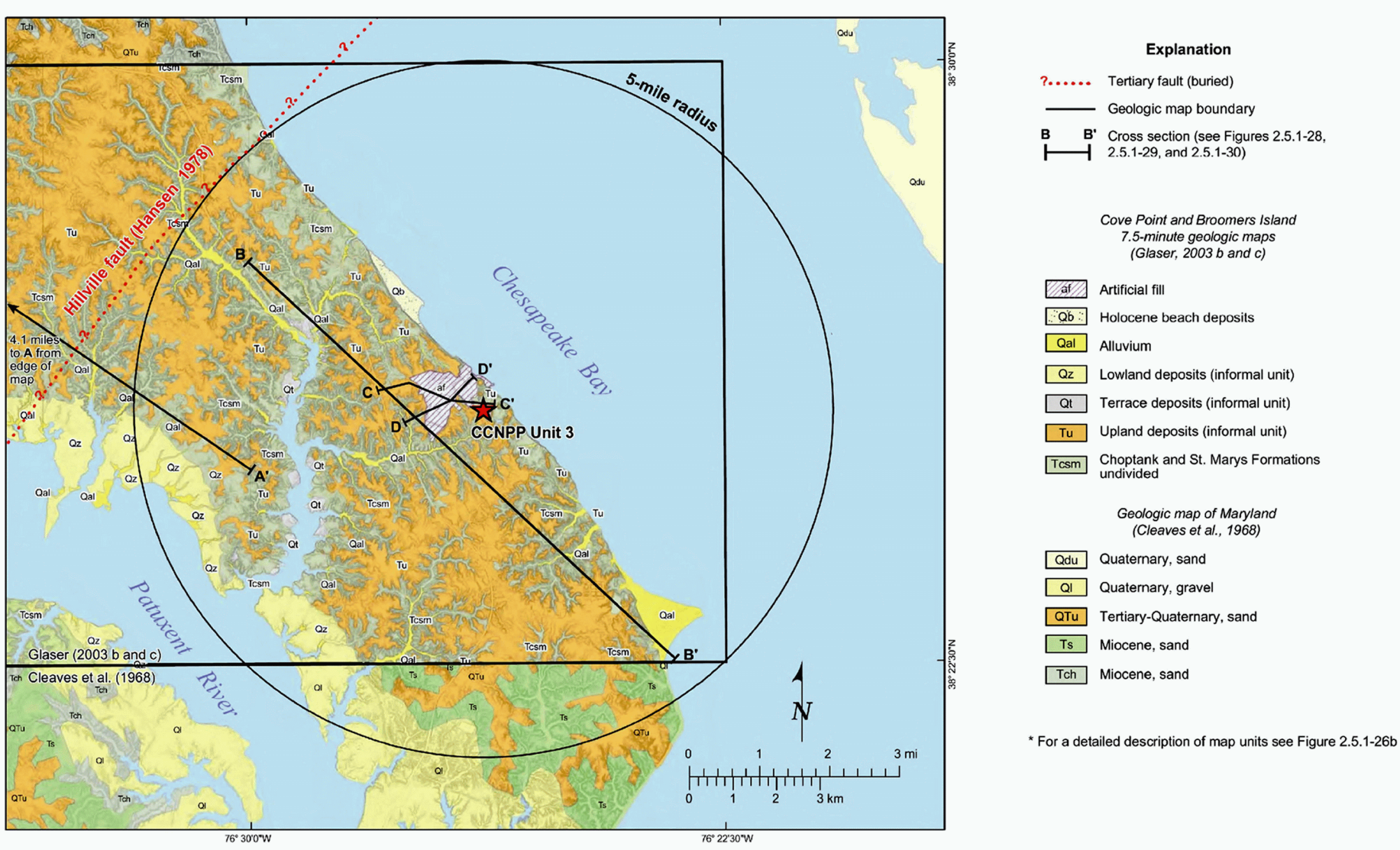
*Refer to table below for feature names

1. Fall lines (Weems, 1988)
2. Ramapo fault system
3. Kingston fault
4. New York Bight fault (offshore)
5. Cacoosing Valley earthquake
6. Lancaster seismic zone
7. New Castle County faults
8. Upper Marlboro faults
9. Everona fault-Mountain Run fault zone
10. Stafford fault (Mixon et al., 2000)
11. Lebanon Church fault
12. Central Virginia seismic zone
13. Hopewell fault
14. Old Hickory faults
15. Stanleytown-Villa Heights faults
16. Stafford fault system of Marple (2004)
17. East Coast fault system (Marple and Talwani, 2007)

Note: Emb is an equivalent body wave magnitude explained in Section 2.5.2.1.

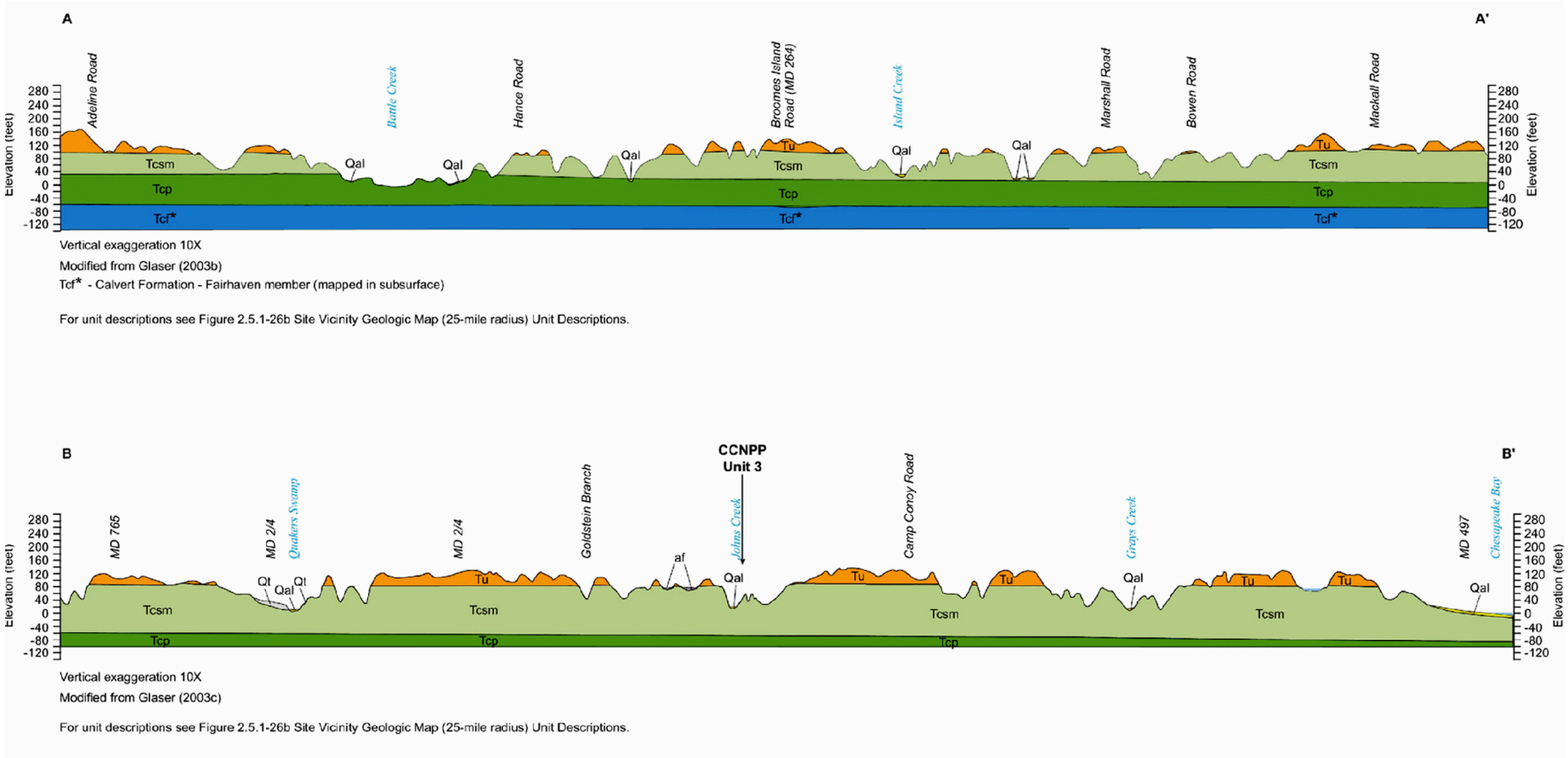
© 2007 UniStar Nuclear Services, LLC. All rights reserved.
COPYRIGHT PROTECTED

Figure 2.5-32—{Site Area Geologic Map 5-Mile (8-Km) Radius}



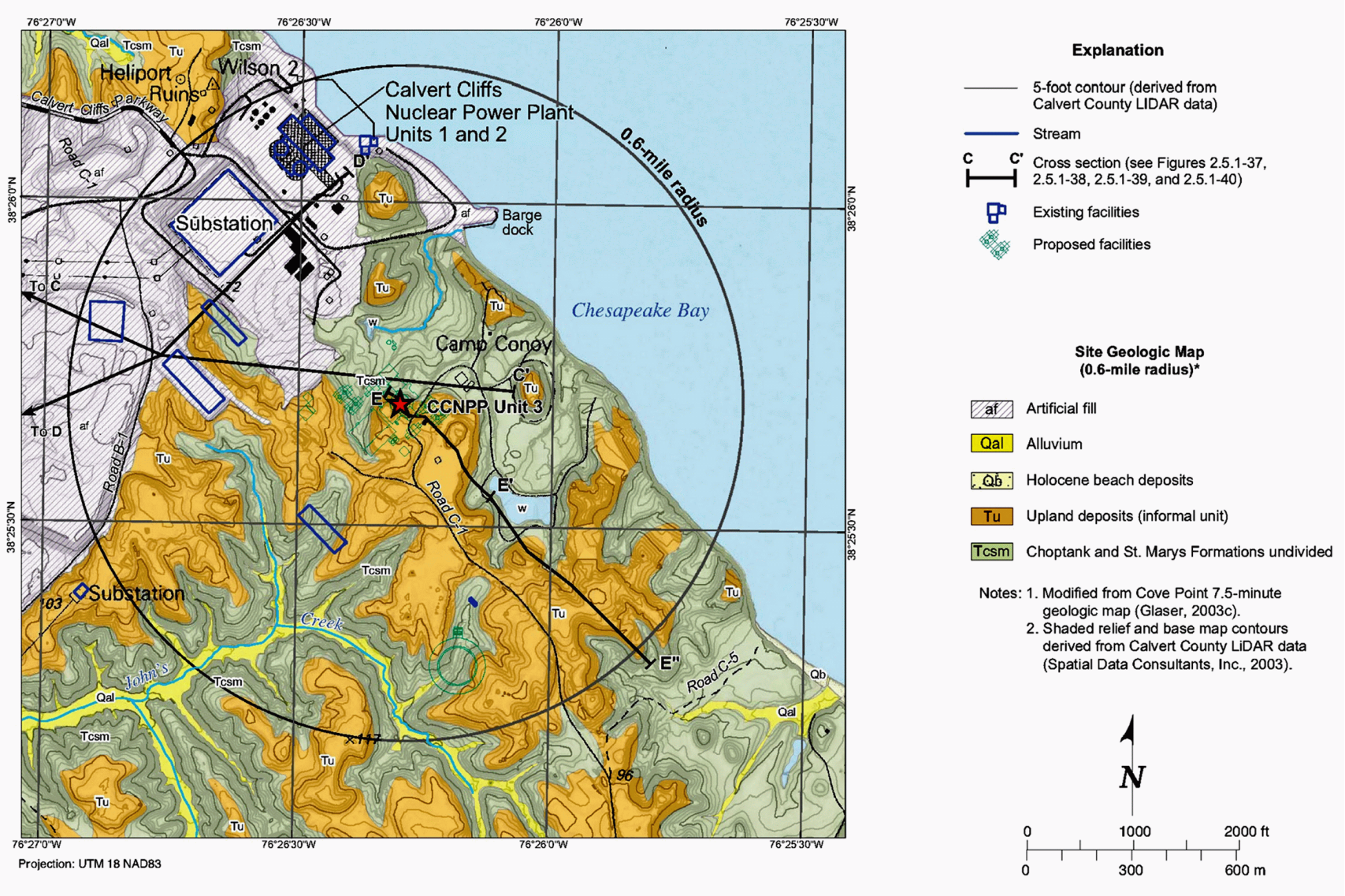
© 2007 UniStar Nuclear Services, LLC. All rights reserved.
COPYRIGHT PROTECTED

Figure 2.5-33—{Site Area Geologic Cross Sections A-A′ and B-B′ 5-Mile (8-Km) Radius}



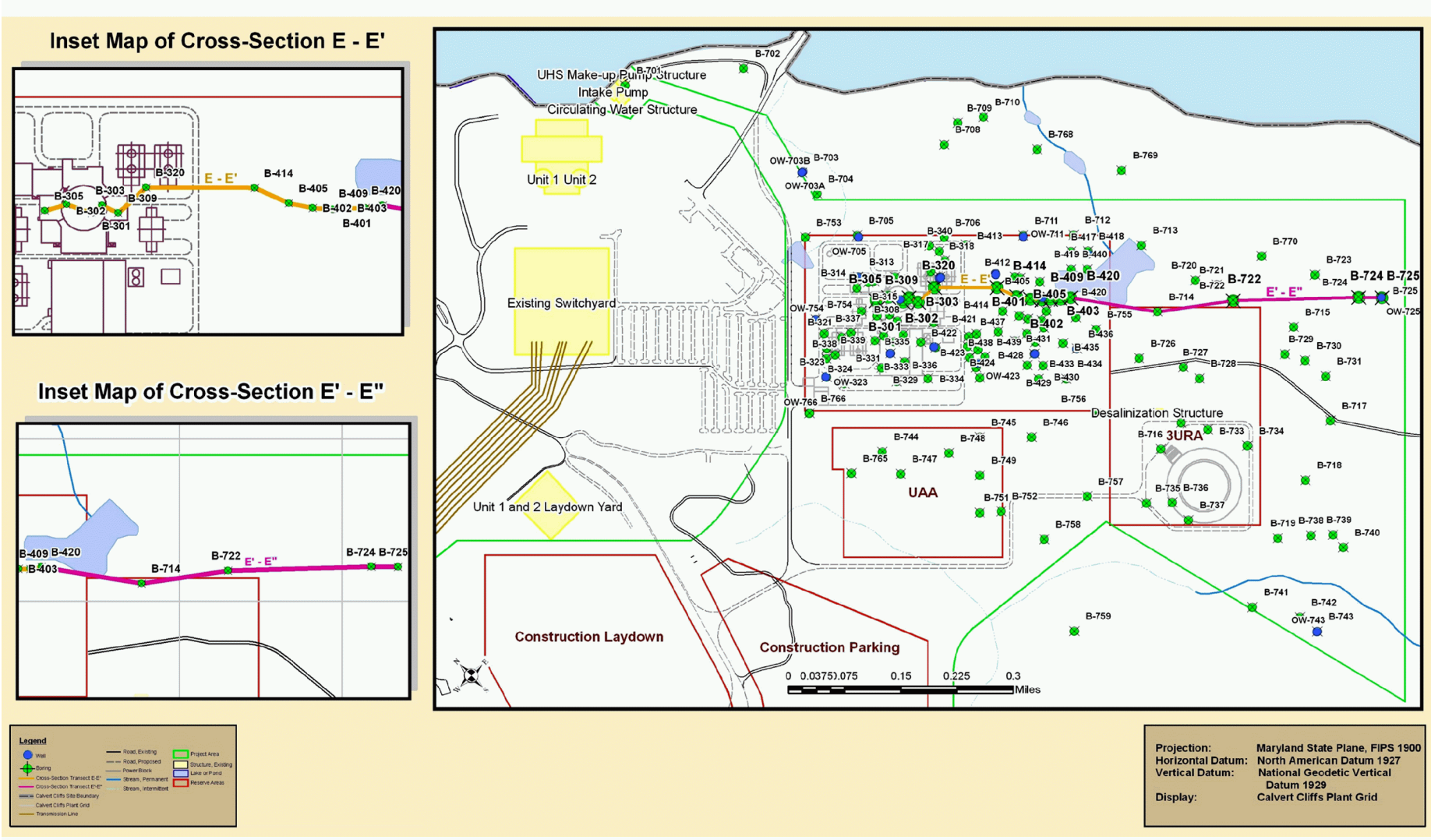
© 2007 UniStar Nuclear Services, LLC. All rights reserved.
COPYRIGHT PROTECTED

Figure 2.5-34—{Site Geologic Map 0.6-mi (1-km) Radius}



© 2007 UniStar Nuclear Services, LLC. All rights reserved.
COPYRIGHT PROTECTED

Figure 2.5-35—{Boring Location Map CCNPP 3}



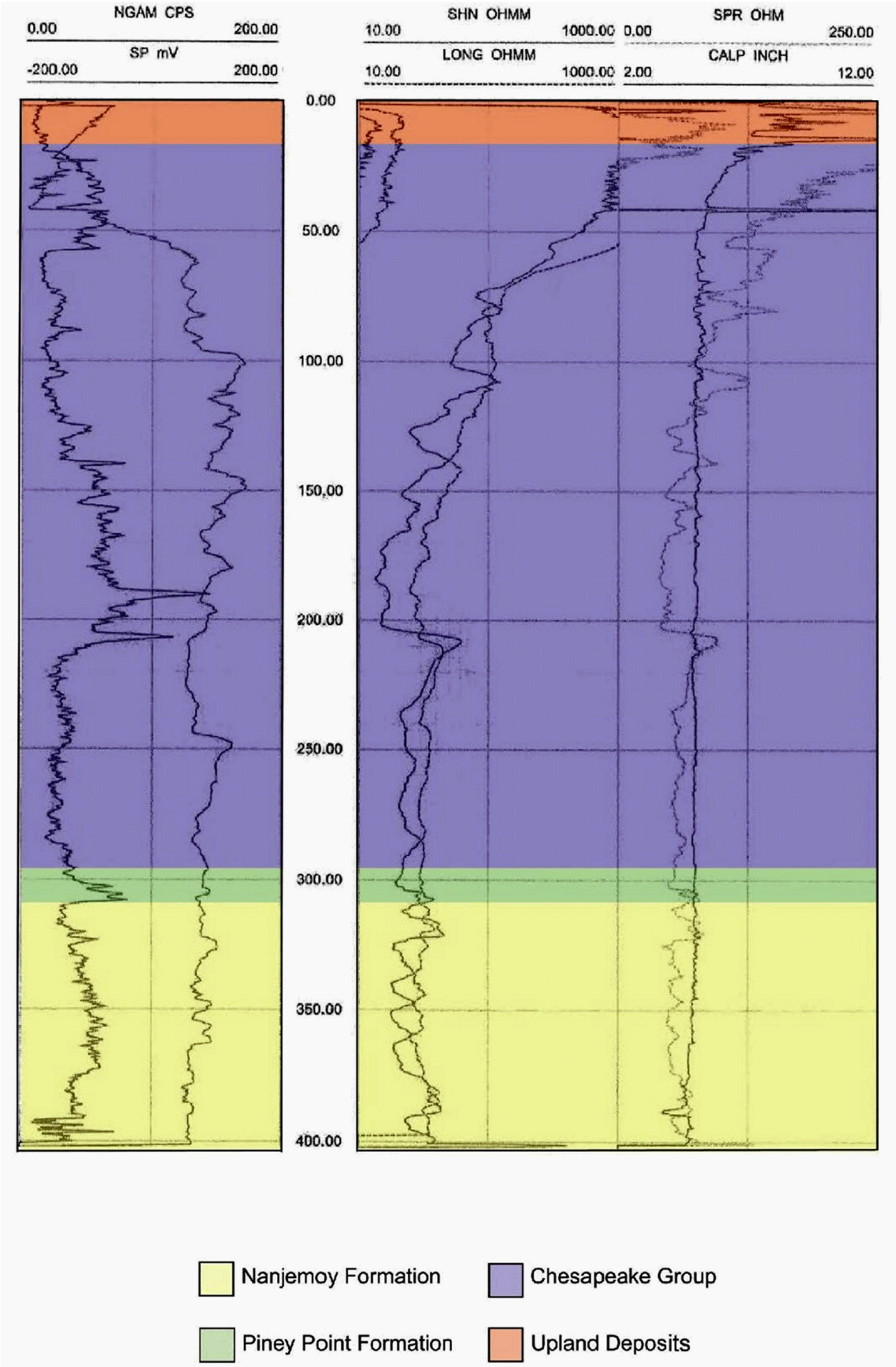
© 2007 UniStar Nuclear Services, LLC. All rights reserved.
COPYRIGHT PROTECTED

Figure 2.5-36—{CCNPP Site Specific Stratigraphic Column}

ERA	PERIOD	EPOCH		AGE (Ma)	UNIT	THICKNESS (FT)
Cenozoic	Quarter-nary	Holocene		0.01	**Alluvium & Beach Deposits**	0-50
		Pleistocene		1.8	**Terrace & Lowland Deposits**	
	Tertiary	Pliocene		5.3	**Upland Deposits**	0-50
		Miocene	Upper	11.2		
			Middle	16.4	**Chesapeake Group** St. Marys Formation Choptank Formation Calvert Formation	245-280
		Eocene	Middle	49	**Piney Point Formation**	20
			Lower	54.8	**Nanjemoy Formation**	180
		Paleocene	Upper	61	**Marlboro Clay** **Aquia Formation**	165-170
			Lower	65	**Brightseat Formation**	10-20
Mesozoic	Cretaceous	Upper		99	**Magothy, Monmouth, Matawan Formations undifferentiated**	30?
		Lower		144	**Potomac Group** **Patapsco Formation** **Arundel/Patuxent Formations (undivided)**	1000-1100 750-900
Proterozoic/ Paleozoic				543+	**Metamorphic/Igneous**	

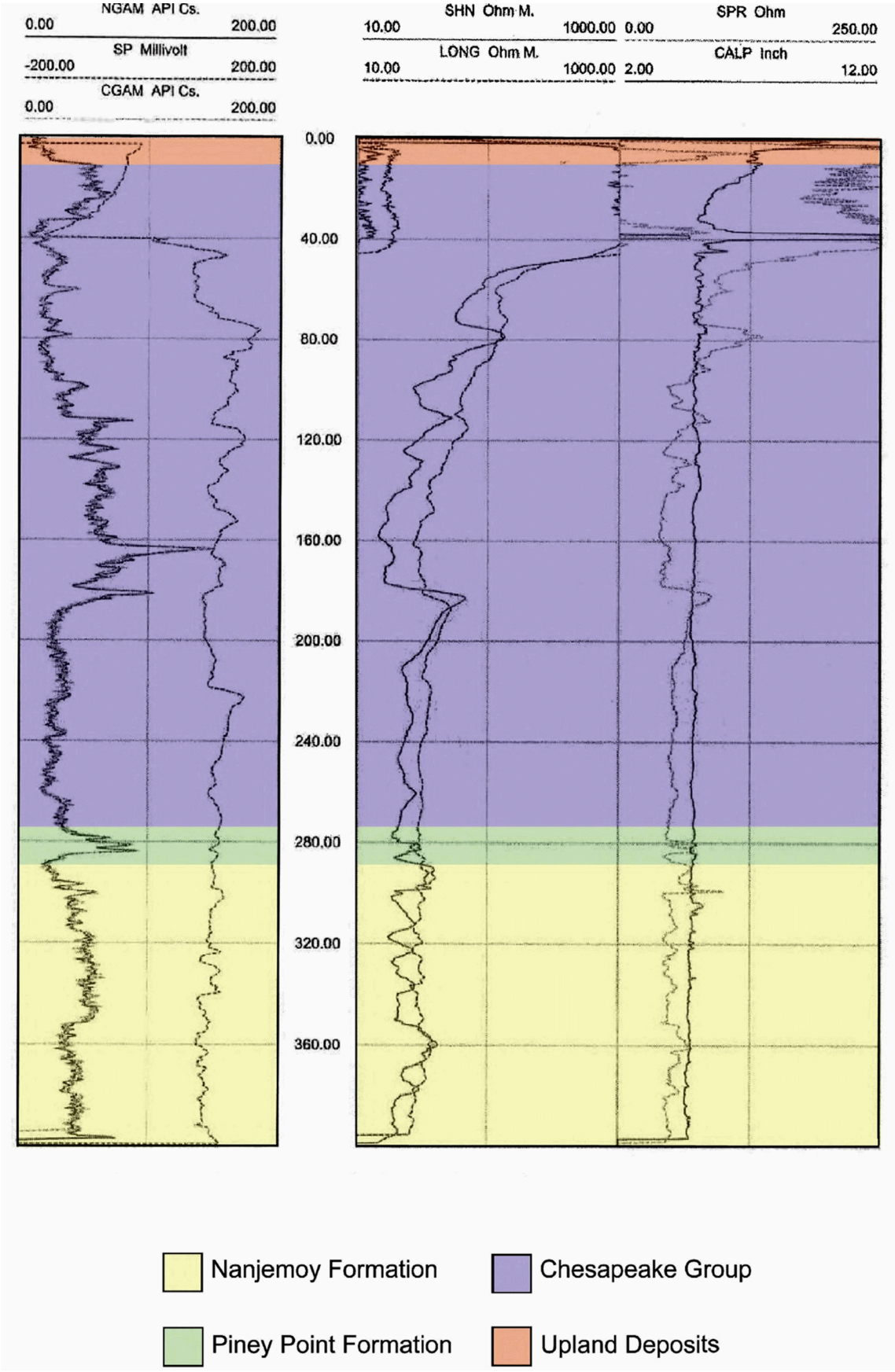
© 2007 UniStar Nuclear Services, LLC. All rights reserved.
COPYRIGHT PROTECTED

Figure 2.5-37—{Boring B-301, Caliper, Natural Gamma, Resistivity and SP Logs}



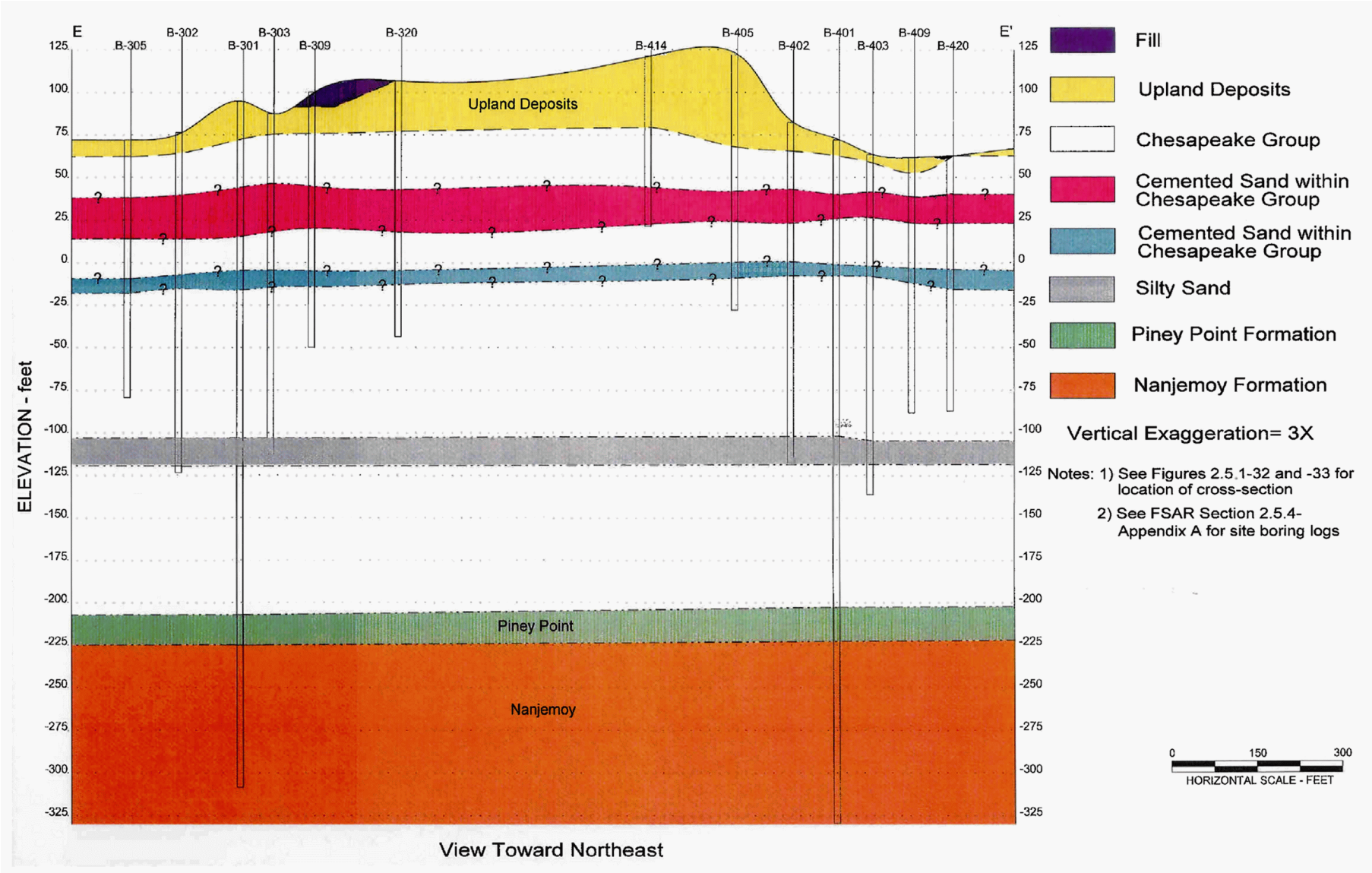
© 2007 UniStar Nuclear Services, LLC. All rights reserved.
COPYRIGHT PROTECTED

Figure 2.5-38—{Boring B-401, Caliper, Natural Gamma, Resistivity and SP Logs}



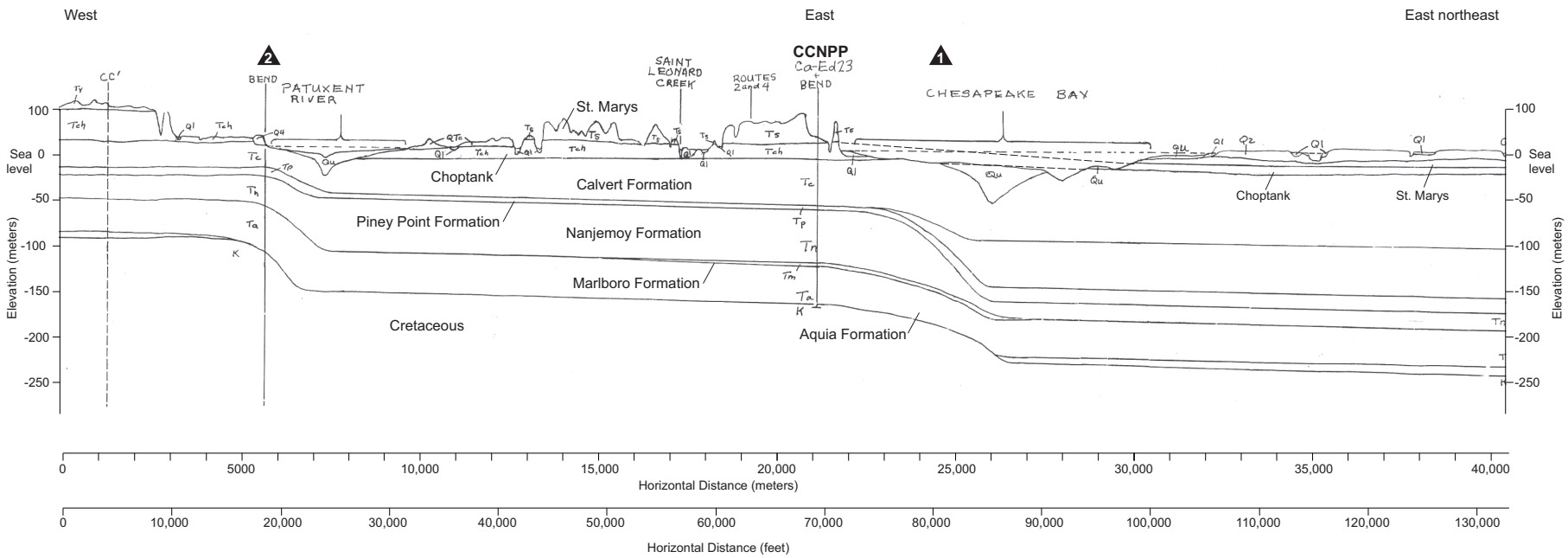
© 2007 UniStar Nuclear Services, LLC. All rights reserved.
COPYRIGHT PROTECTED

Figure 2.5-39—{Subsurface Profile E-E'}



© 2007 UniStar Nuclear Services, LLC. All rights reserved.
COPYRIGHT PROTECTED

Figure 2.5-40—{Cross Section}



Explanation

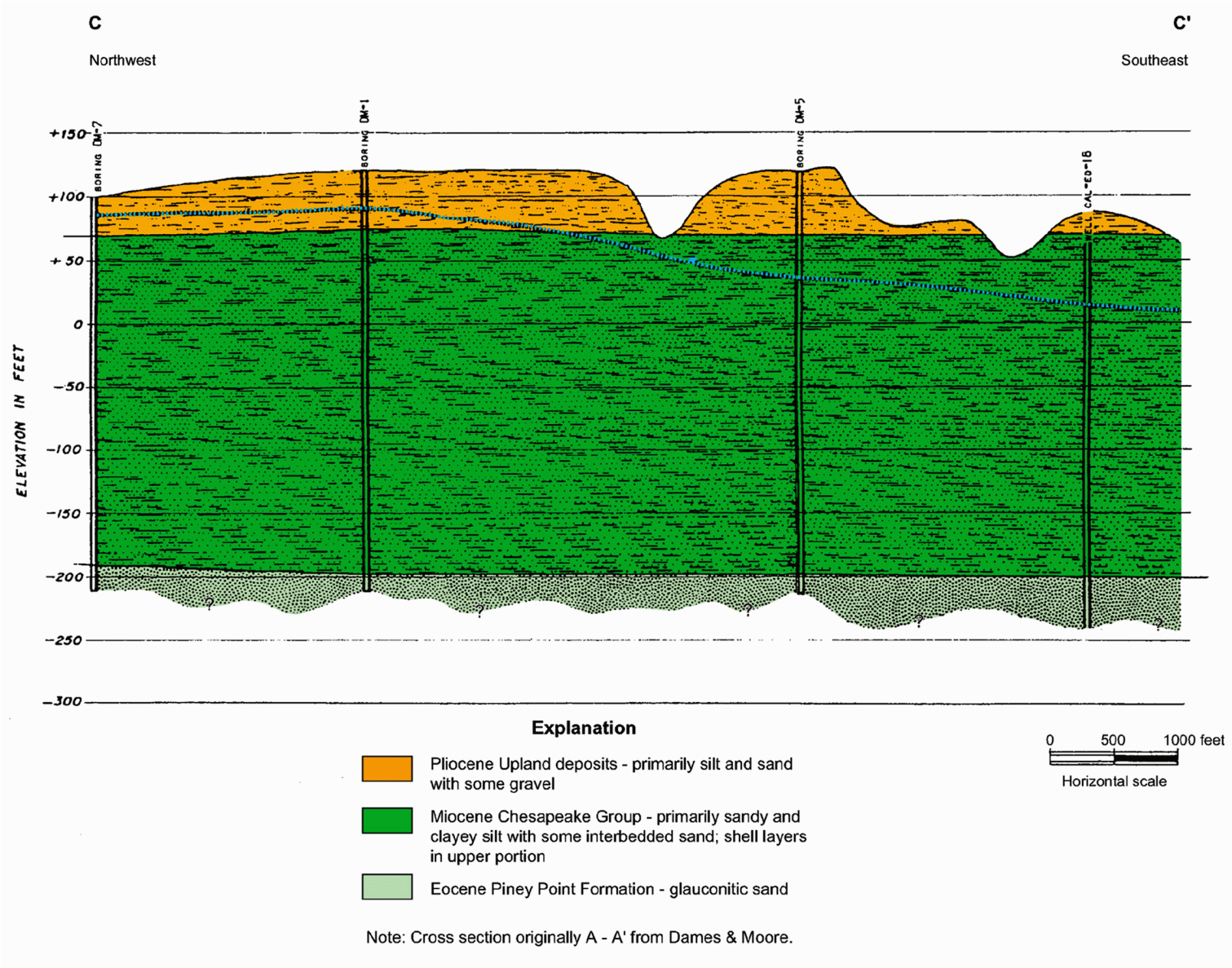
1 Location of inferred warp shown on Figure 2.5-25; vertical exaggeration = ~25X

Note: The above portion of section A - A' was modified from McCartan et al. (1995).

1782 Rev. 3 03.17.09

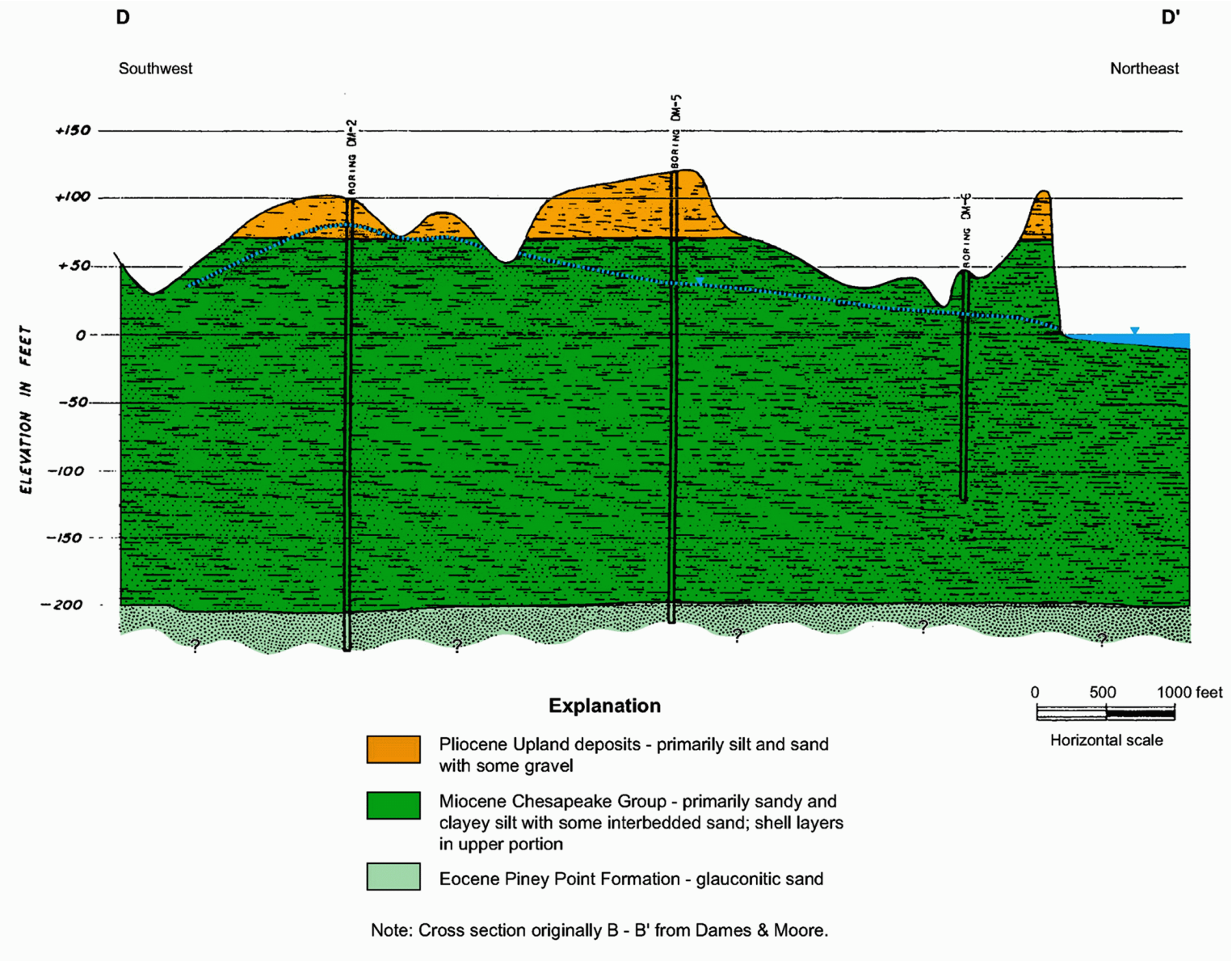
© 2007 UniStar Nuclear Services, LLC. All rights reserved.
COPYRIGHT PROTECTED

Figure 2.5-41—{Geologic Section C-C'}



© 2007 UniStar Nuclear Services, LLC. All rights reserved.
COPYRIGHT PROTECTED

Figure 2.5-42—{Geologic Section D-D'}



© 2007 UniStar Nuclear Services, LLC. All rights reserved.
COPYRIGHT PROTECTED