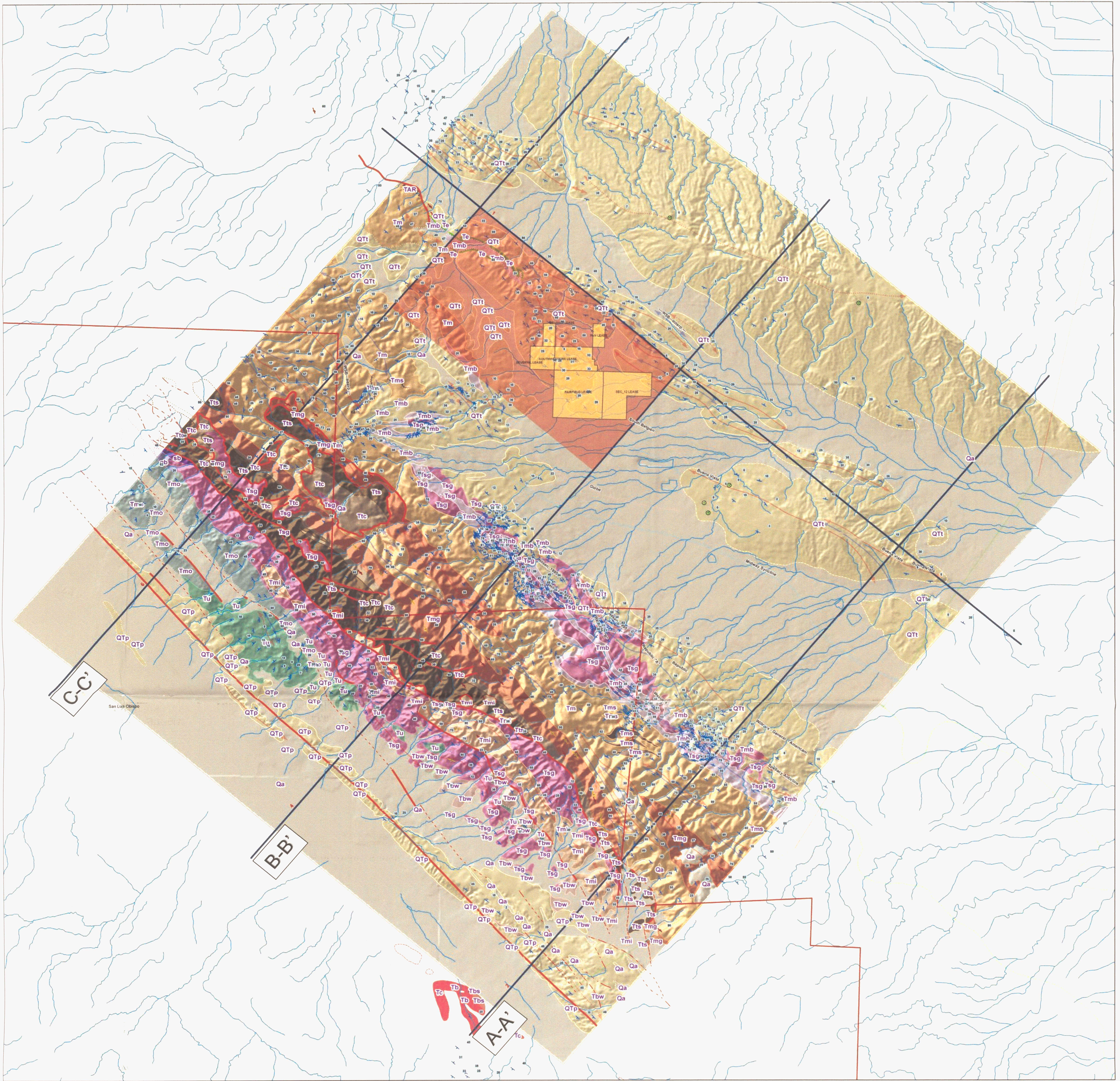
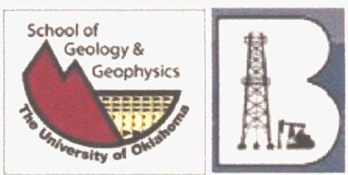


GEOLOGIC MAP OF THE SOUTHERN BELGIAN ANTICLINE AREA, NORTH MIDWAY-SUNSET FIELD, SAN JOAQUIN BASIN CALIFORNIA.



W. Sebastian Bayer (The University of Oklahoma)
28 September 2006
Supervised By:
Dr Roger Statt
Dr Shankar Mitra
Dr James Forgoison
NAD 1983
UTM Zone 11 N
Source:
See References

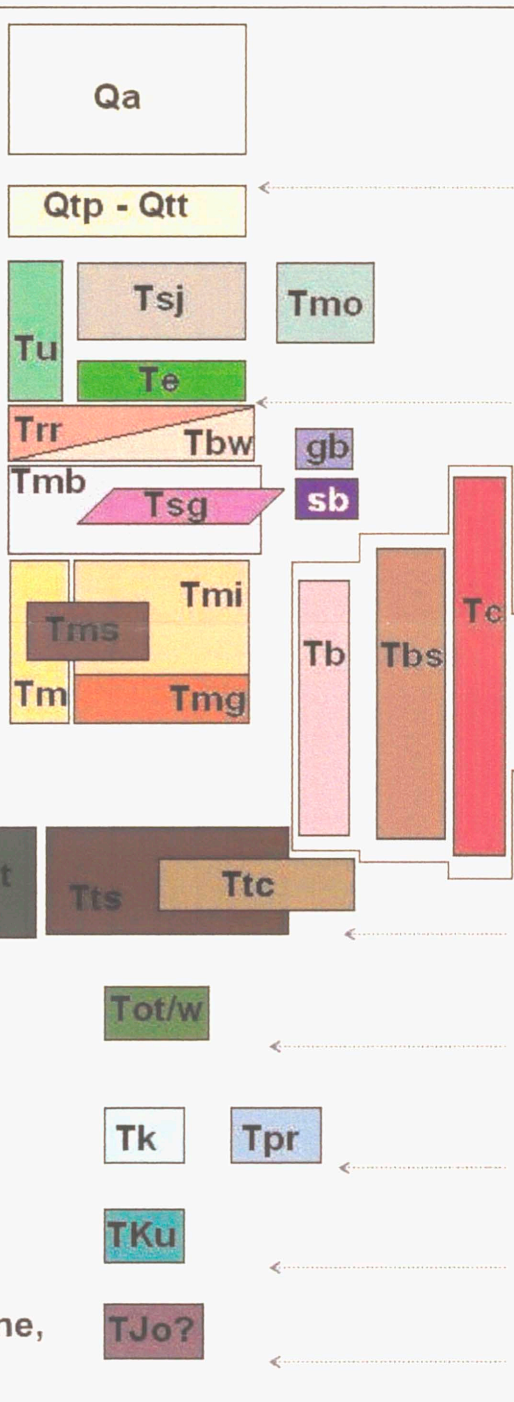


berry_leases	Structural Data	QTI?	Tmb?	QTI	Tma	Tu
Main Fold Axis	Horizontal	F?	Tms	Oa	Tmb	gb
Fold_type, SATUS	Overturned	Tmo?	Tm	TAR	Tmg	sb
Anticline, ?	Vertical	Te	Tm?	Tbc	Tmi	Structural Geologic Model
Anticline, OK	normal	Tu	Tbs	Tmo		
Anticline, lower lv.	Anticline, lower lv.	Tu?	Tmg	Tms		
Syncline, ?	Tb	Tm (Tar)	Tma	Tc	Tsg	
Syncline, OK	Tbs	Tbw	Tc	Te	Ttc	
Syncline, lower lv.	Ttc	Tbw?	Tc?	Tm	Tts	
	Tbc					
	Qtt					
	F					
	Qtp?					
	Qtp					
	Tmb					



Qa: Pre Tulare/Paso-Robles Surficial Sediments
Qtp: Paso Robles Fm; Lgh-gray to tan (gra-ss). Redish (ss-clay) alluv-dep
Qtt: Tulare Formation; peb-cbl-grbl (Mtry_silc-shale) grad ss.& ss-cly unc-mioc_pinch-Wst
Tu: Unnamed Marine sed.; Friable-tan-fss. Pliocene-shallow-mollusks. eq-low-etchegoin.
Tmo: Morales Formation; lght-gry-cong-ss. less-red-gry-silt pebb-granite conf-Tsg terrestrial.
Tsj: San Joaquin Fm.; mostly mudstone
Te: Etchegoin Formation; Marine-ark-ss (andesite-grains). inter-silt. Gray weathers-brown unc on Tmb
Trr: Soft gray marine claystone less than 200 ft (McLure valley) late-Mio
Tbw: Bitterwater Cr Sh.; Hard, brittle Shale inter strat with ss. Brown-weather-white
Tmb: Monterey Belridge Diatomite; White-wdrng soft porous fissile diatom-shale aren-foram fish scales
-&-metamhp in ss. mtrx.
gb: Granitic breccia; Shattered breccia mass granitic Rck -In Tsg
sb: Schist breccia; Shattered breccia -mass- dark fine grained biot-shist -in Tsg

Tsg: Santa Margarita Fm.; Cong.& Breccia bould-cob-pebl_granitic
Tms: Monterey Sandstone lenses; light tan hard to semifriable. Forms lenses as thick as 100 feet in McLure Shale (Tm). Unfossiliferous.
Tm: Monterey McLure sh member; Hard brittle porcelan. sh.-soft chlkwath white Sili (antelo. McDon.)
Tmi: Sh-Ss. Monterey; sh-ss. semi-siliceous sh-(50%-f-ss) Unc-Tsg—mid-Mio
Tmg: Monterey Gould sh. Member; Hrd-brt-porce-silic int-sft chlkw punky thin bds (low diat hg foram) brwn.
Tbs: Branch Canyon SS.
Tc: Caliente Formation
Tb: B. Canyon-Basalt
Ttc: Temblor Formation; clay sh. cly-slt thin dolo layers. local thin lens ss others Silic-sh.
Tts: Temblor Formation; ss-friab-hard loc.calc. thin silt-cly-dolo lens. bioclast shell frg
Tt: Undifferentiated Tembleo Formation
Tot/w: Tumey/Wagonwheel shale & Oceanic sandstone
Tk: Kreyenhagen Shale
Tpr: Point of Rocks Sandstone
TKu: Undifferentiated lower Tertiary and/or Cretaceous sandstone, shale, and Conglomerate Includes Lower Cretaceous (??) and Jurassic (??)
KJo?: Oceanic basement rocks-undifferentiated Coast Range ophiolite and Franciscan Assemblage



Formations to the East of San Andreas Fault

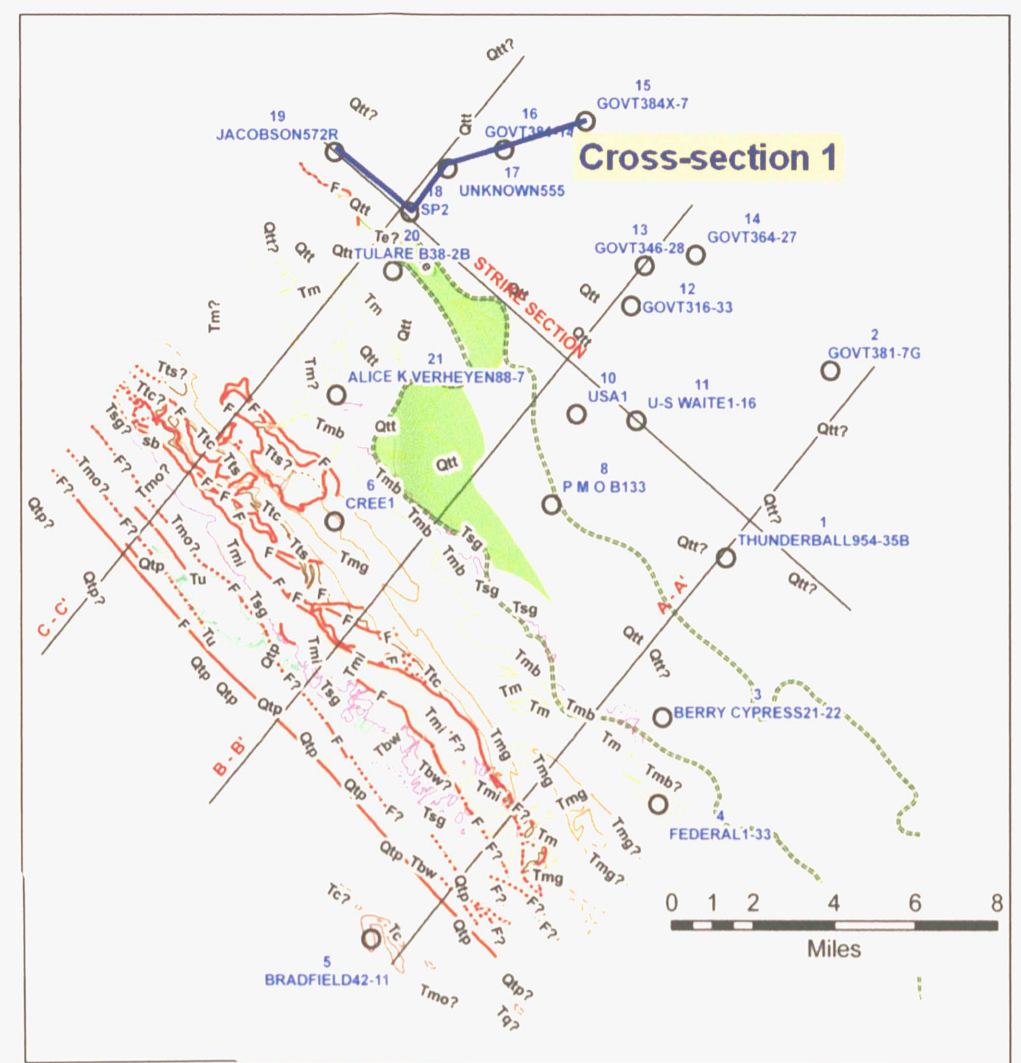


Coordinate System:
NAD_1983 UTM Zone 11N

APPENDIX 1
3D Edited Digital Geologic Map

APPENDIX 2
Stratigraphic Cross Section 1

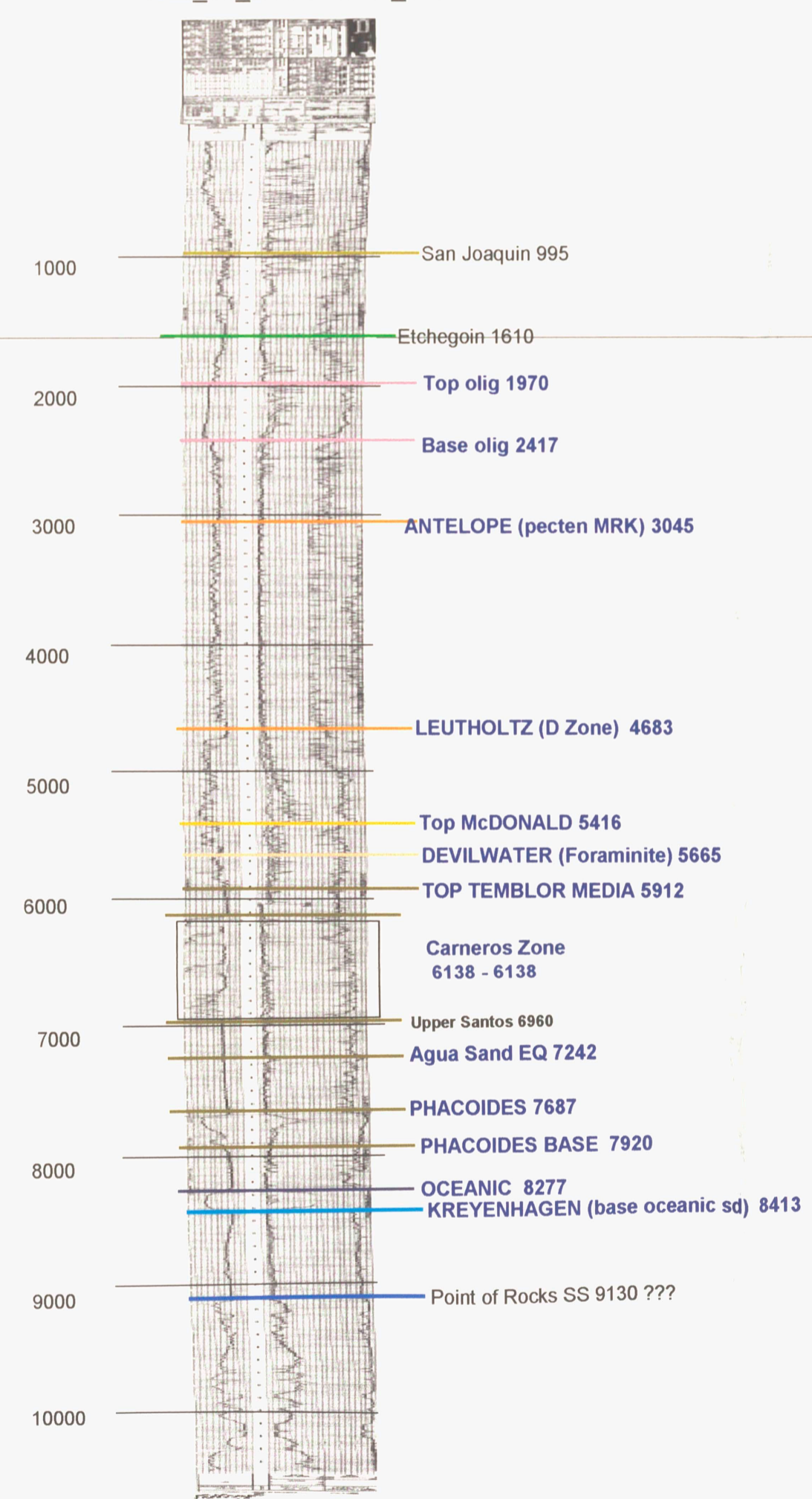
NW



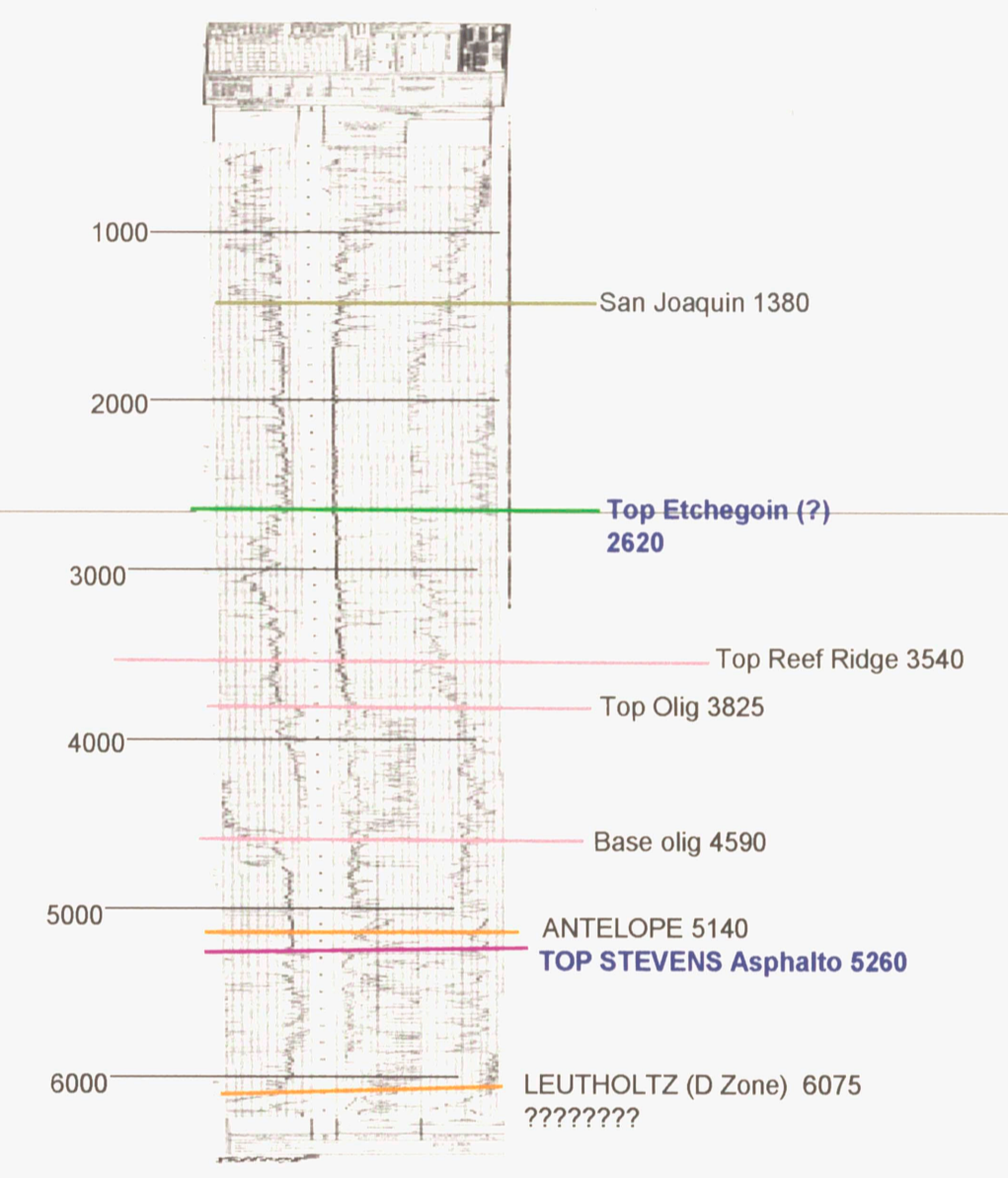
SE

NE

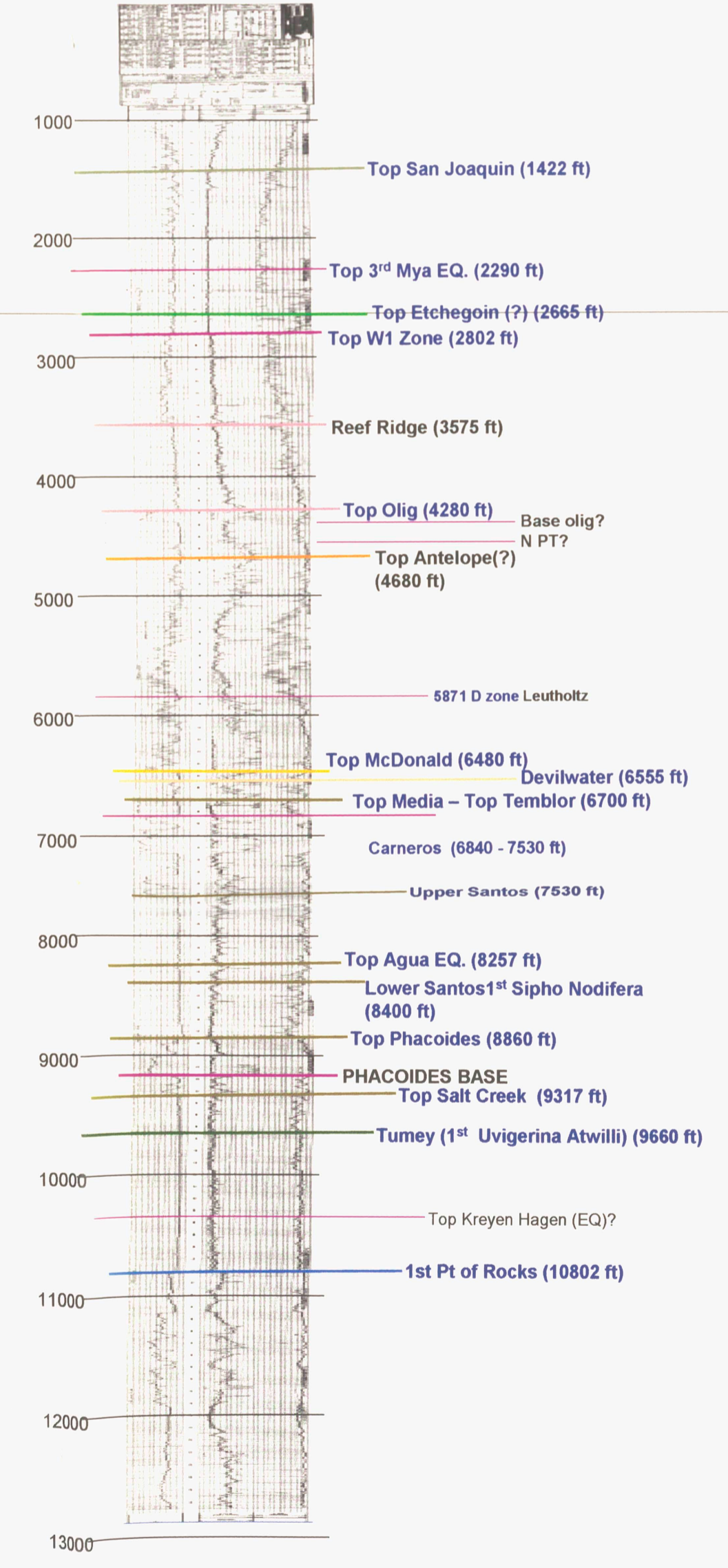
Well_19_JACOBSON_572R



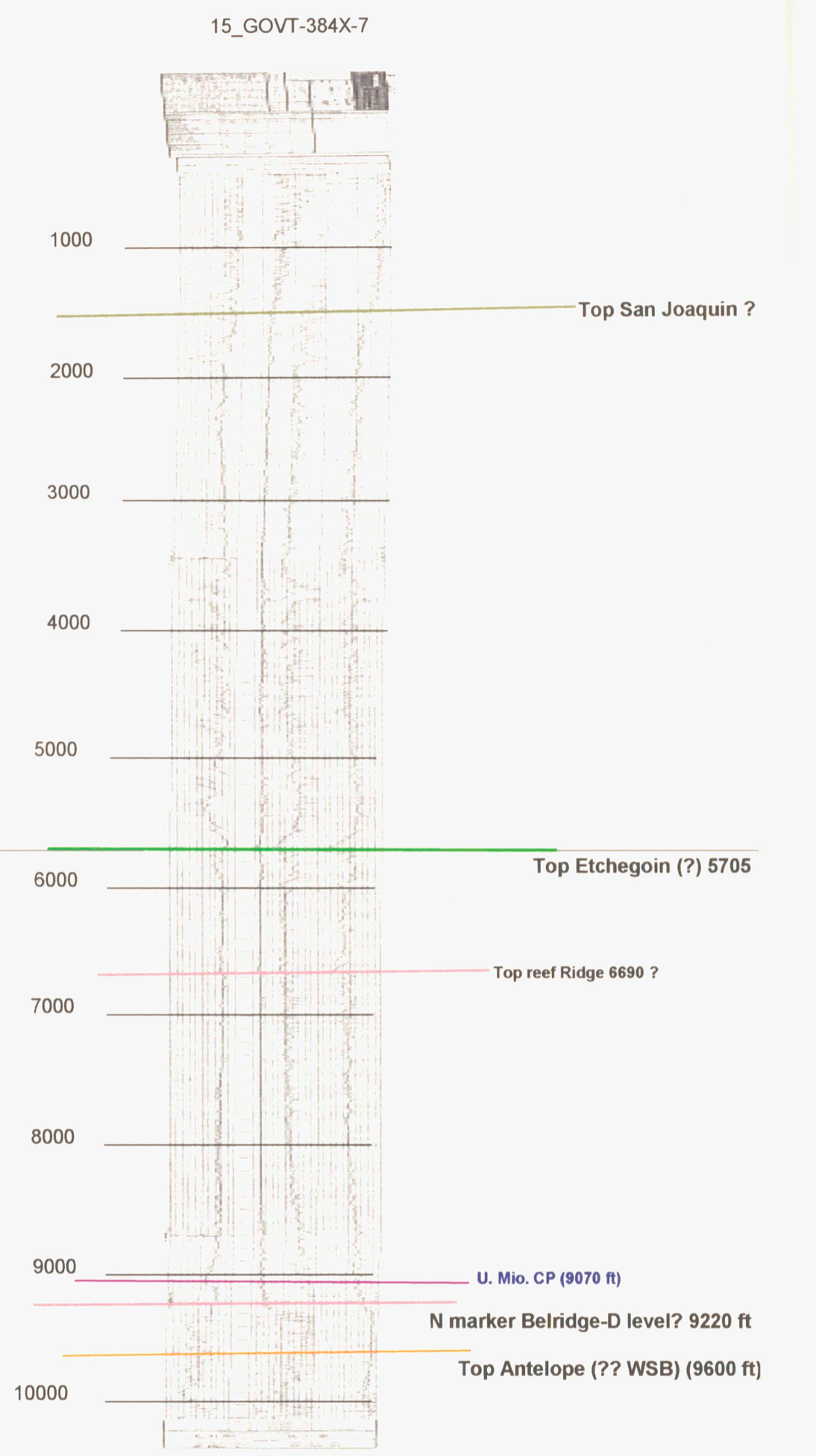
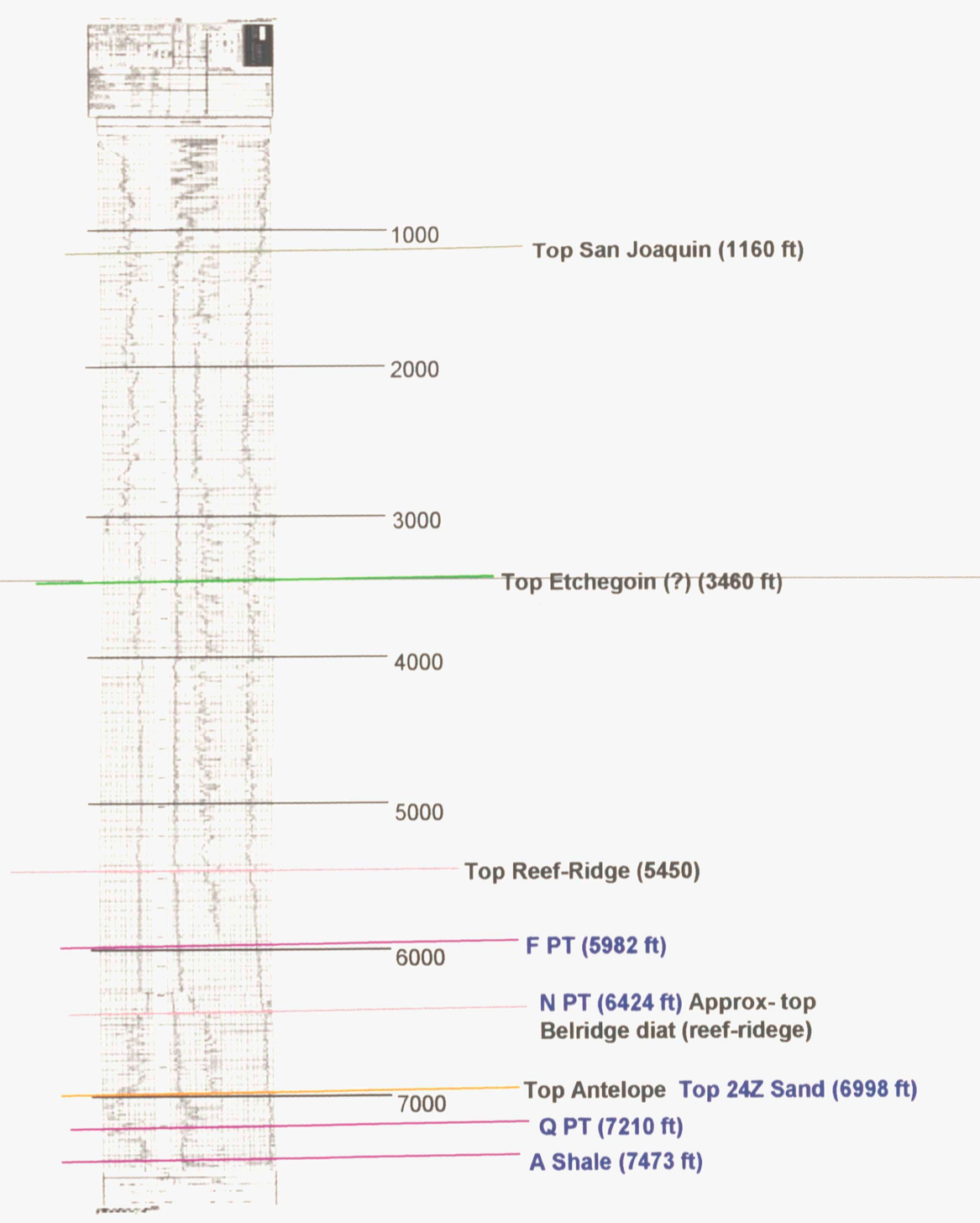
Well_18_SP2



Well_17_555



Well_16_GOVT381-14



Markers in blue indicate that they were obtained from the well drilling report or completion report.

Stratigraphic Cross-section 1 Well-Markers

Strike direction

Dip direction

11.6 Km (Aprox.)

APPENDIX 2b
Stratigraphic Cross Section 2

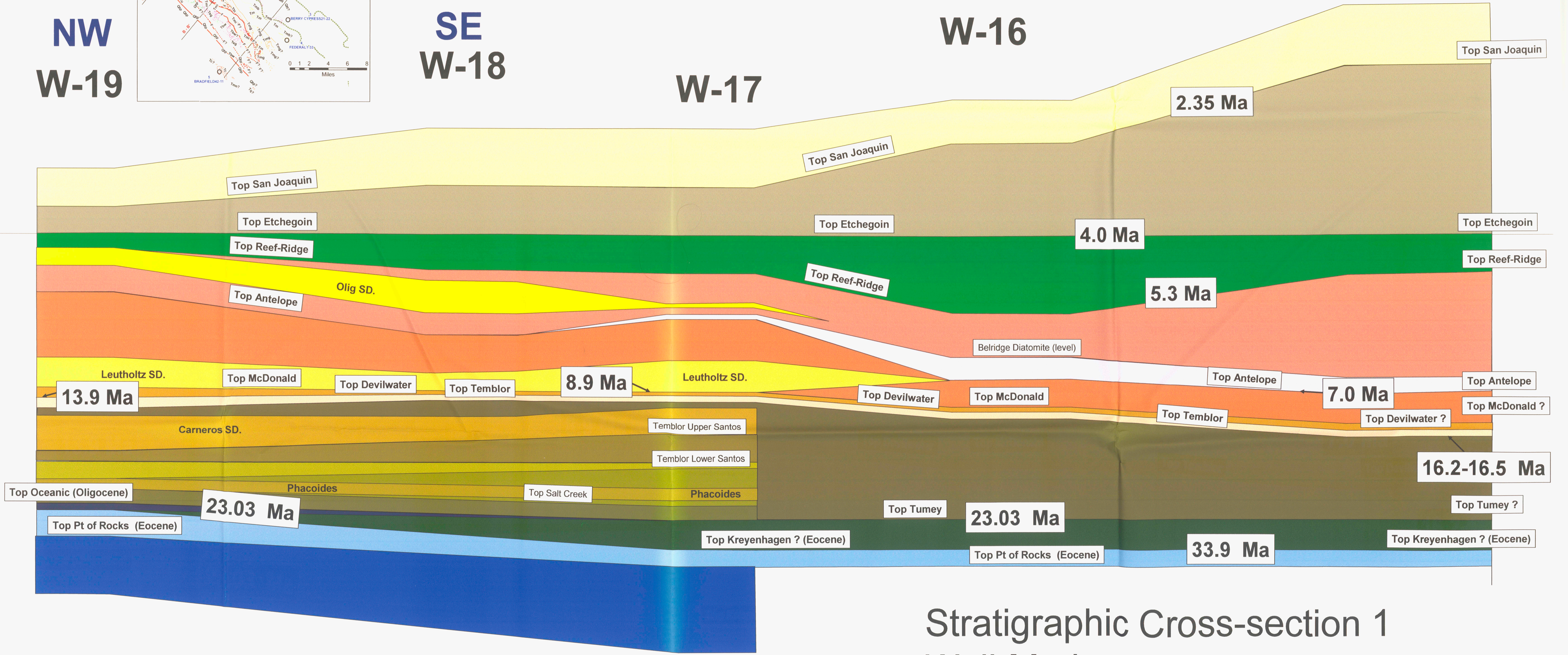
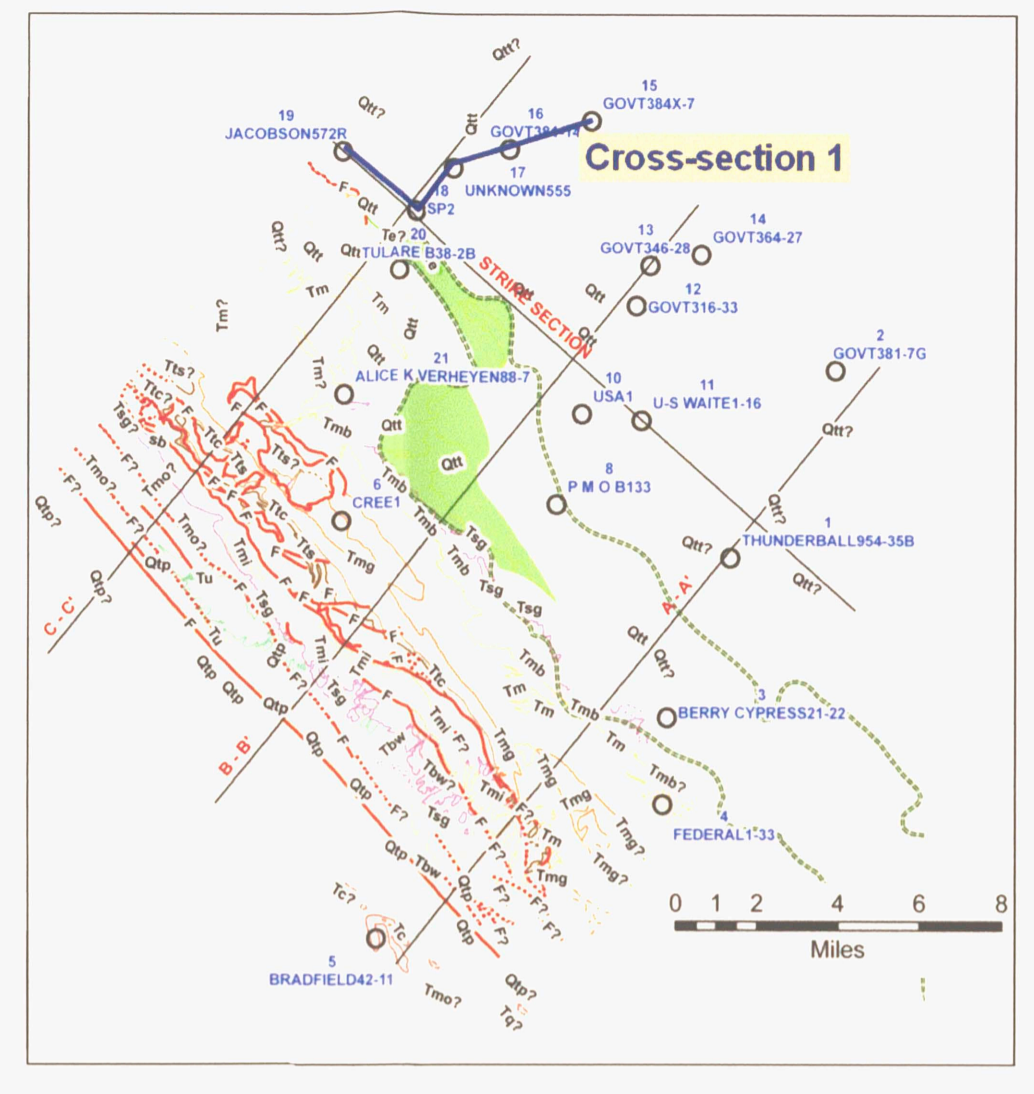
NE
W-15

NW
W-19

SE
W-18

W-16

W-17



Stratigraphic Cross-section 1
Well-Markers



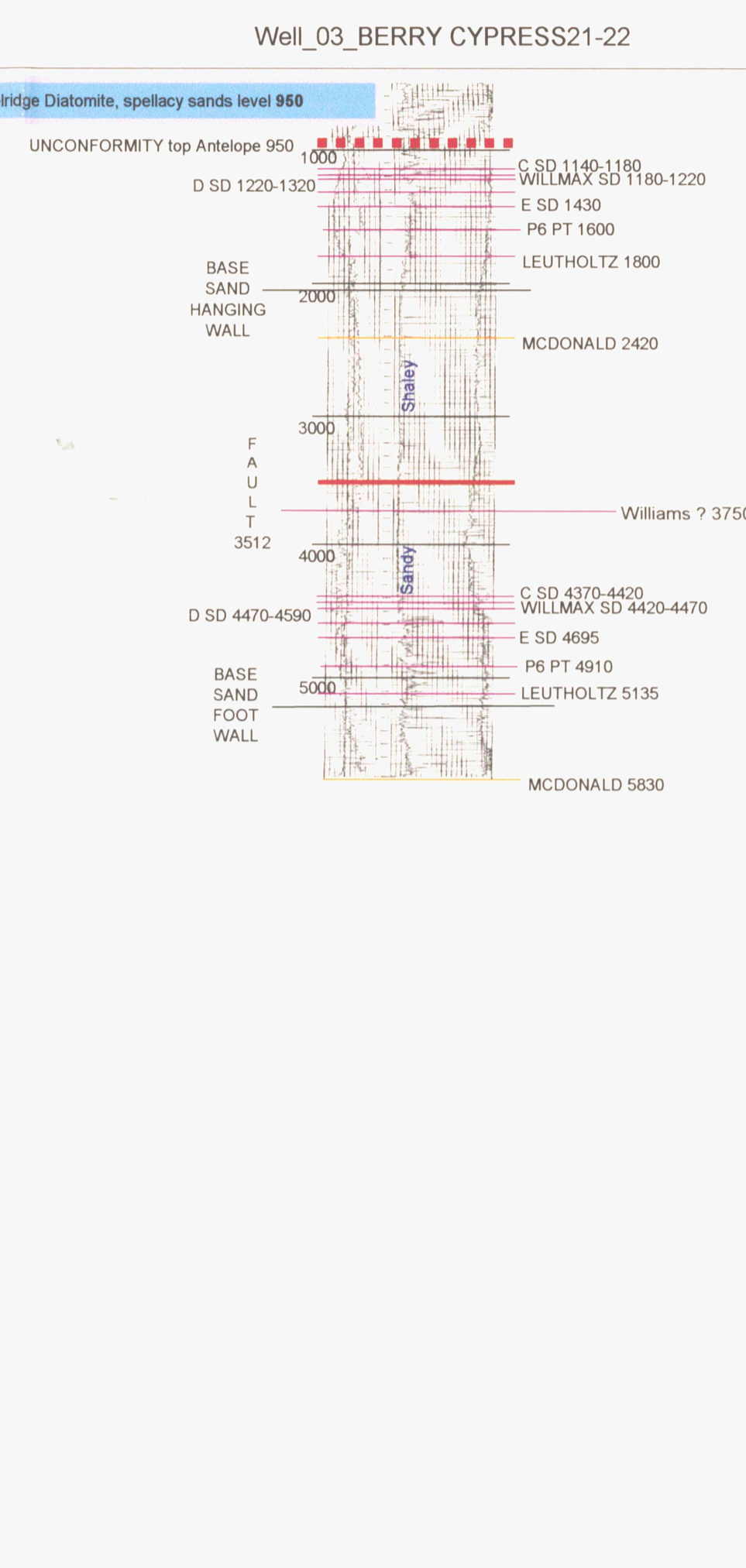
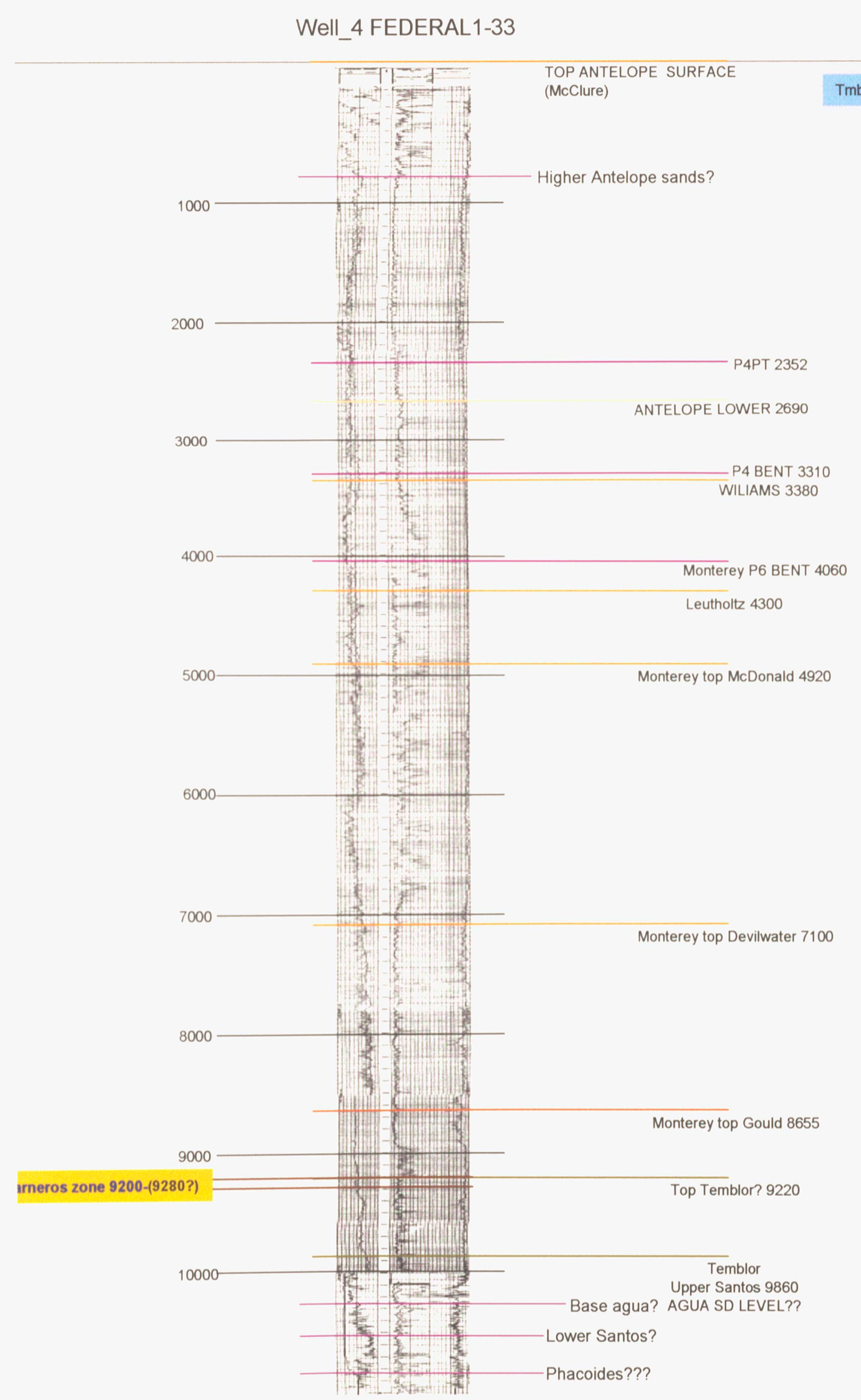
11.6 Km (Aprox.)

SW

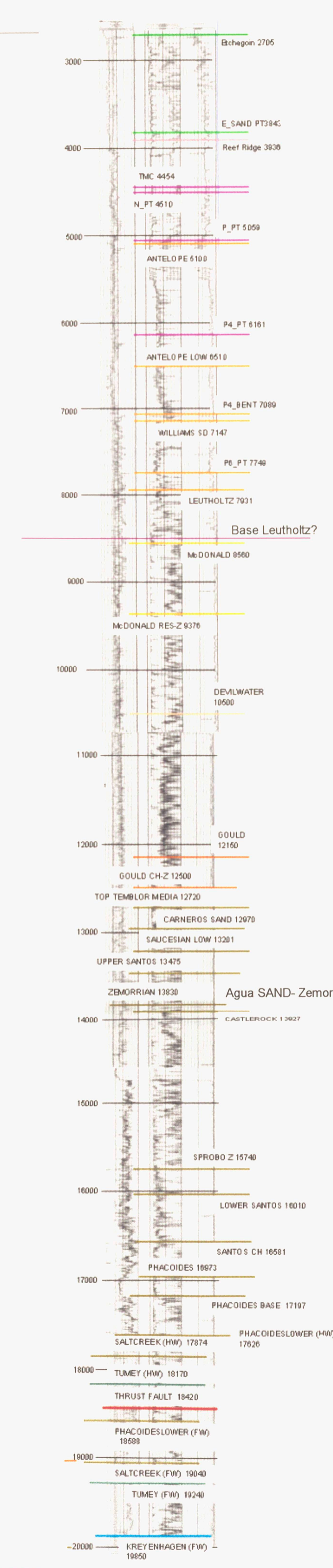
APPENDIX 3
Stratigraphic Cross Section 2

Well_02_GOVT381-7G

NE

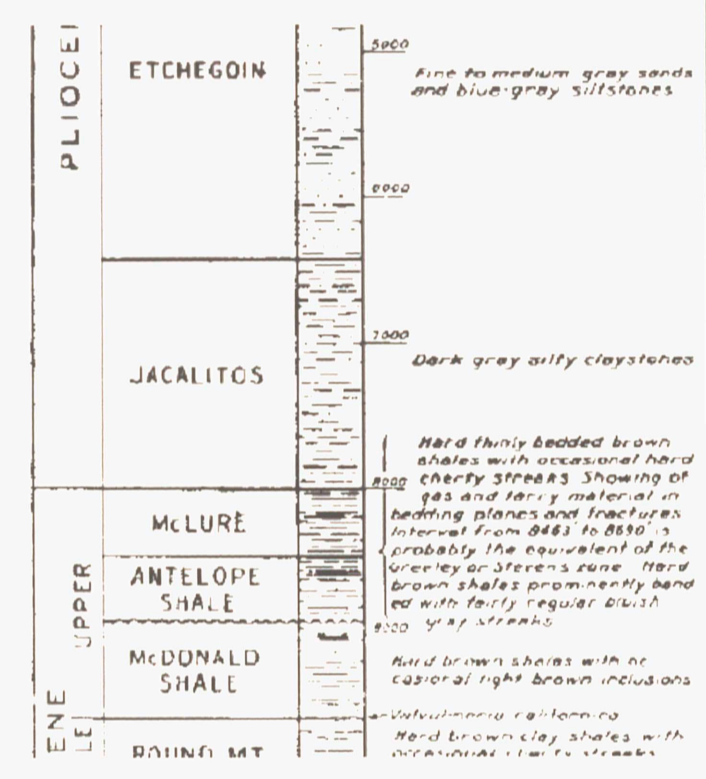


Well_01_THUNDERBALL954-35B



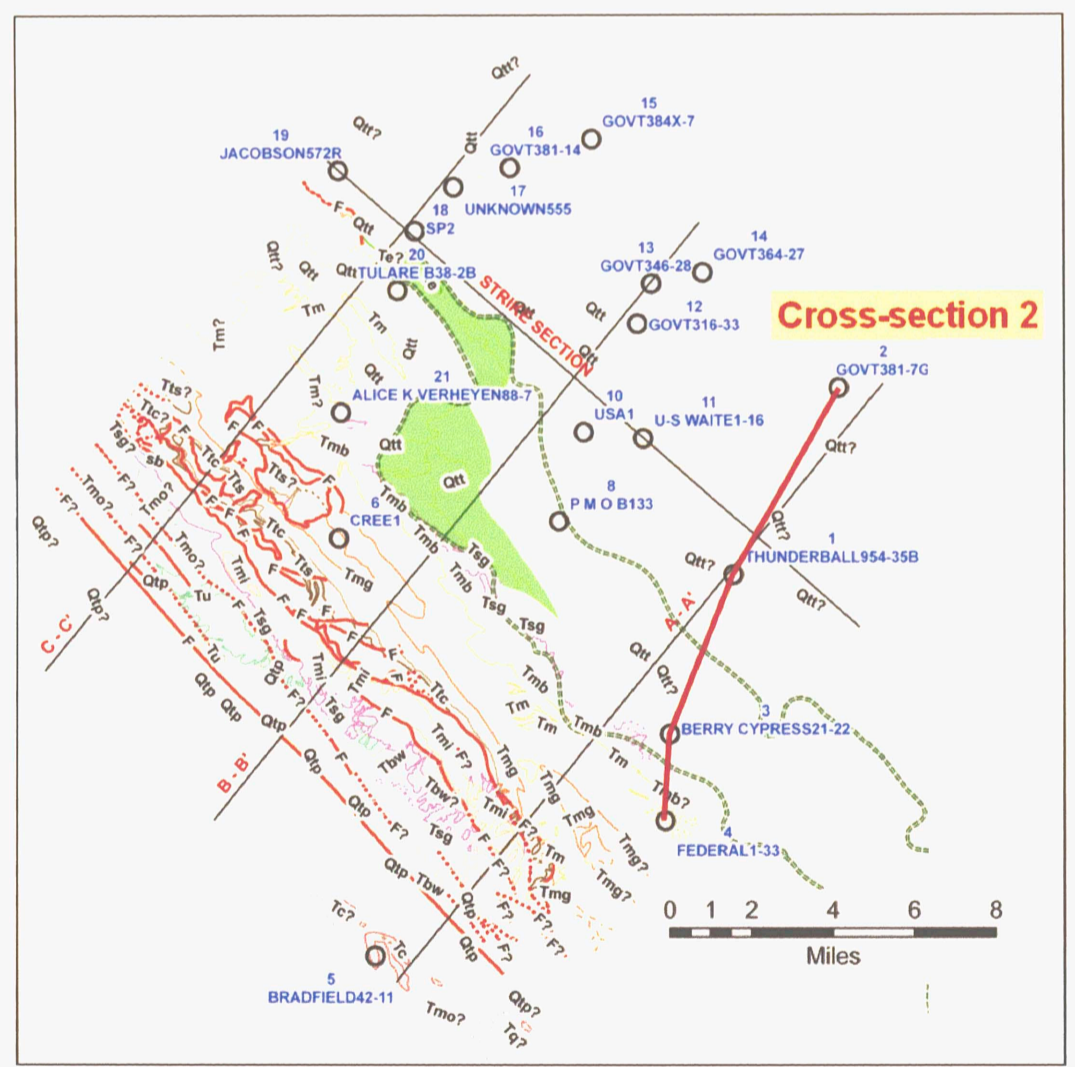
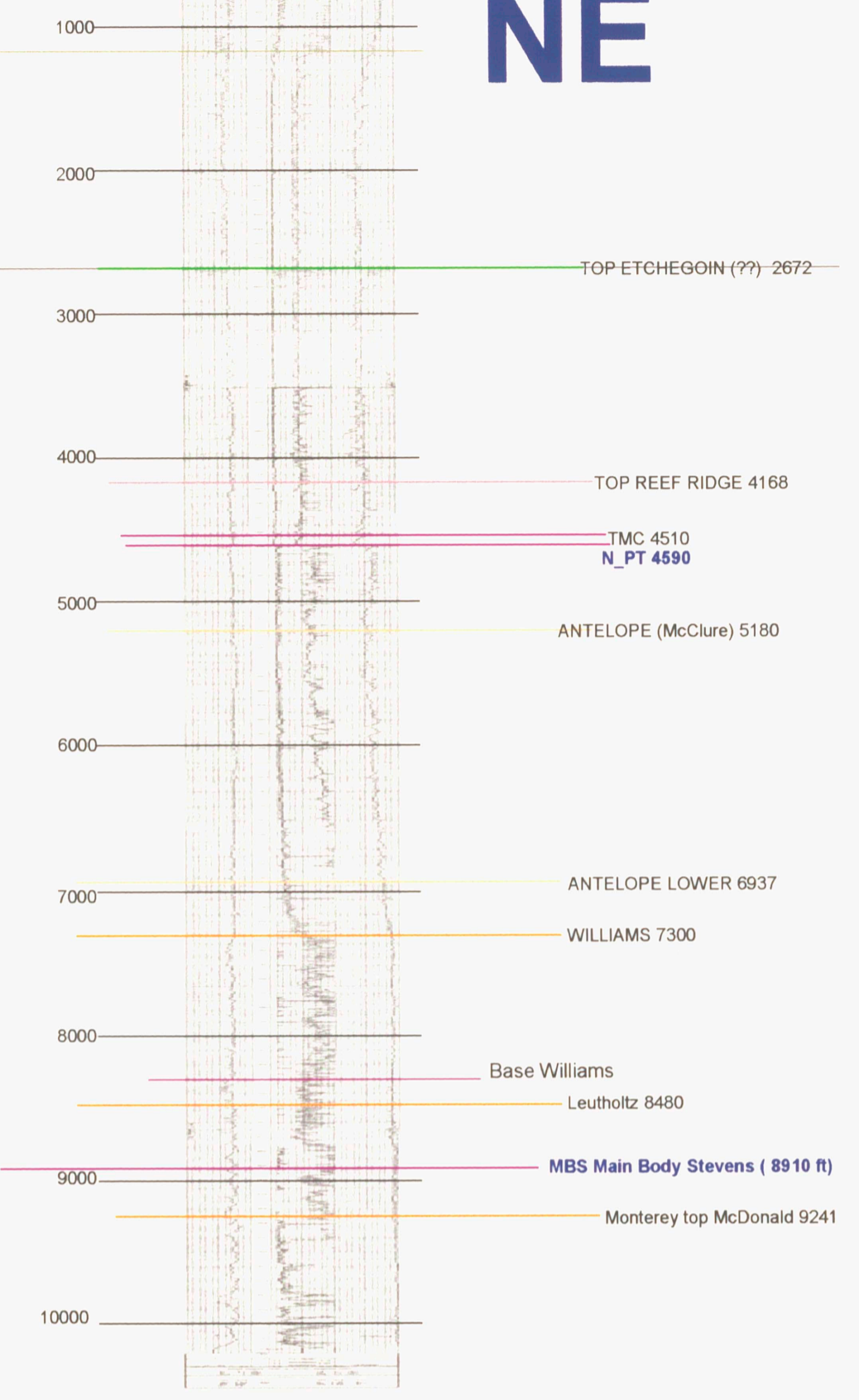
NOTE:
McClure Comprises:
Antelope
McDonald

*****ANTELOPE:**
•For section McClure is
Considered The upper part of Antelope



From:
Noble, E.B., 1940, Rio Bravo oil field, Kern County,
California: American Association of Petroleum Geologists
Bulletin, v. 24, no. 7, p. 1330-1333

TOP San Joaquin (?) 1180

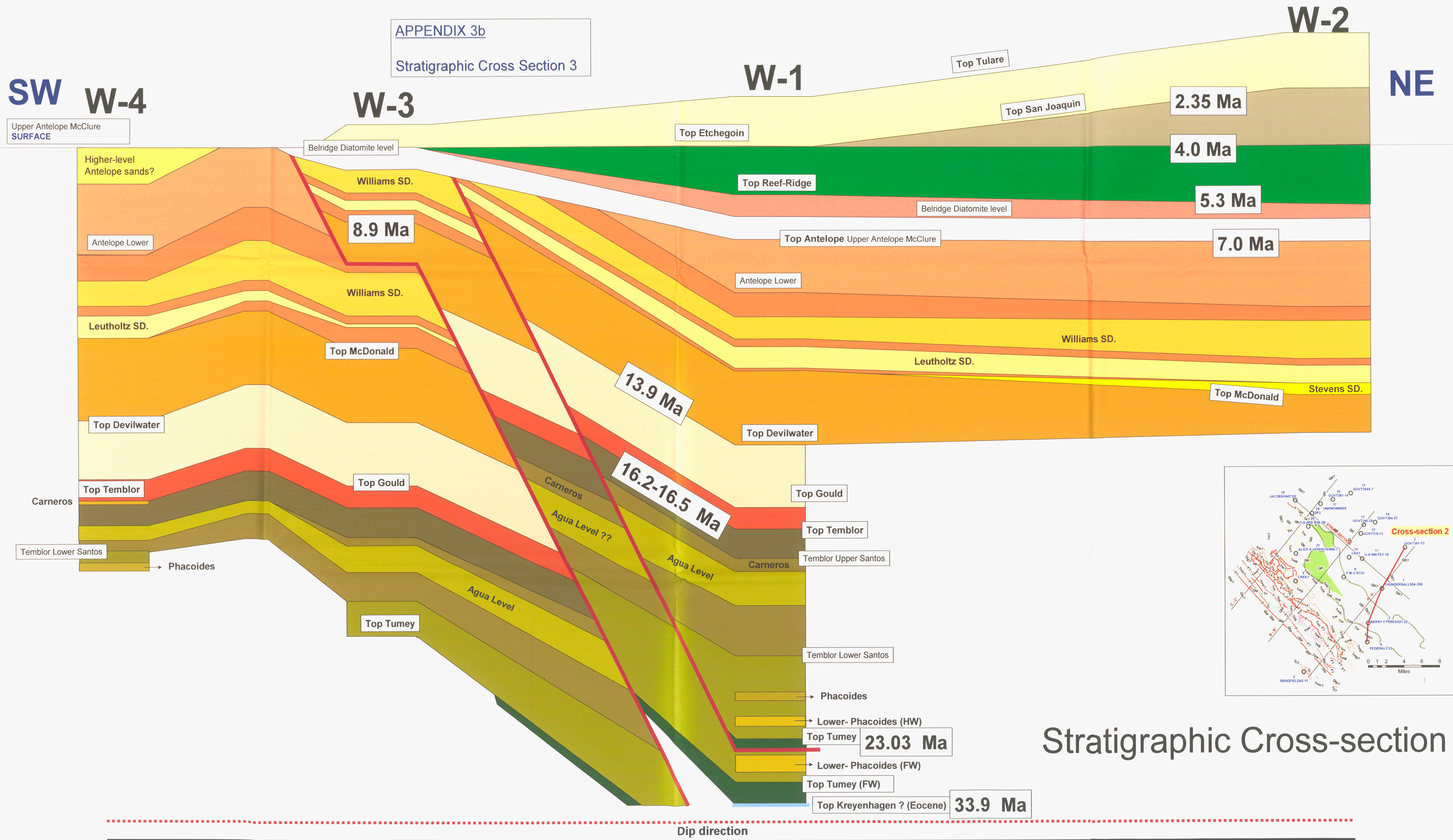


Markers in blue indicate that they were obtained from the well drilling report or completion report.

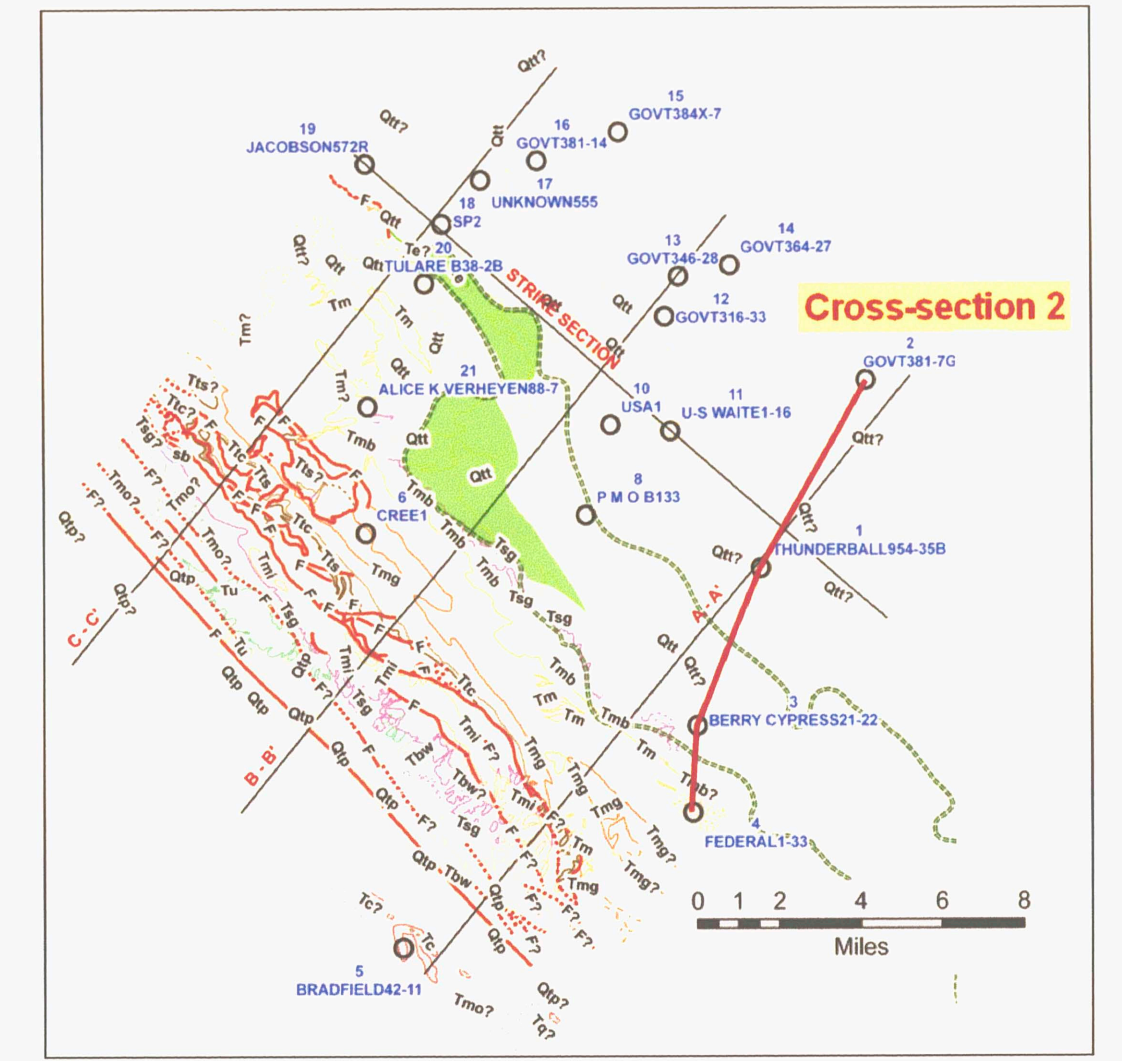
Stratigraphic Cross-section 2 Well-Markers

Dip direc

17.8 Km (Aprox.)



17.8 Km (Aprox.)

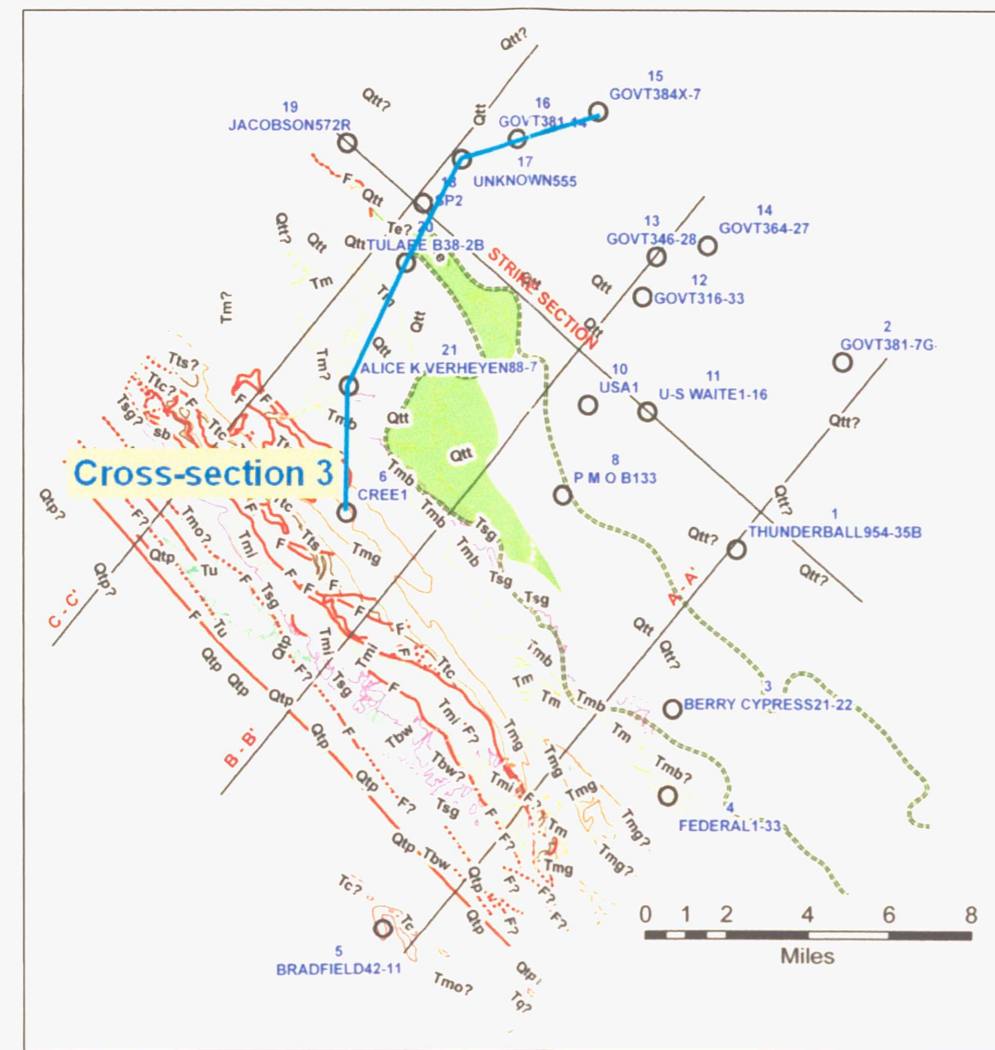


Stratigraphic Cross-section 2

Stratigraphic Cross-section 3 (Well Markers)

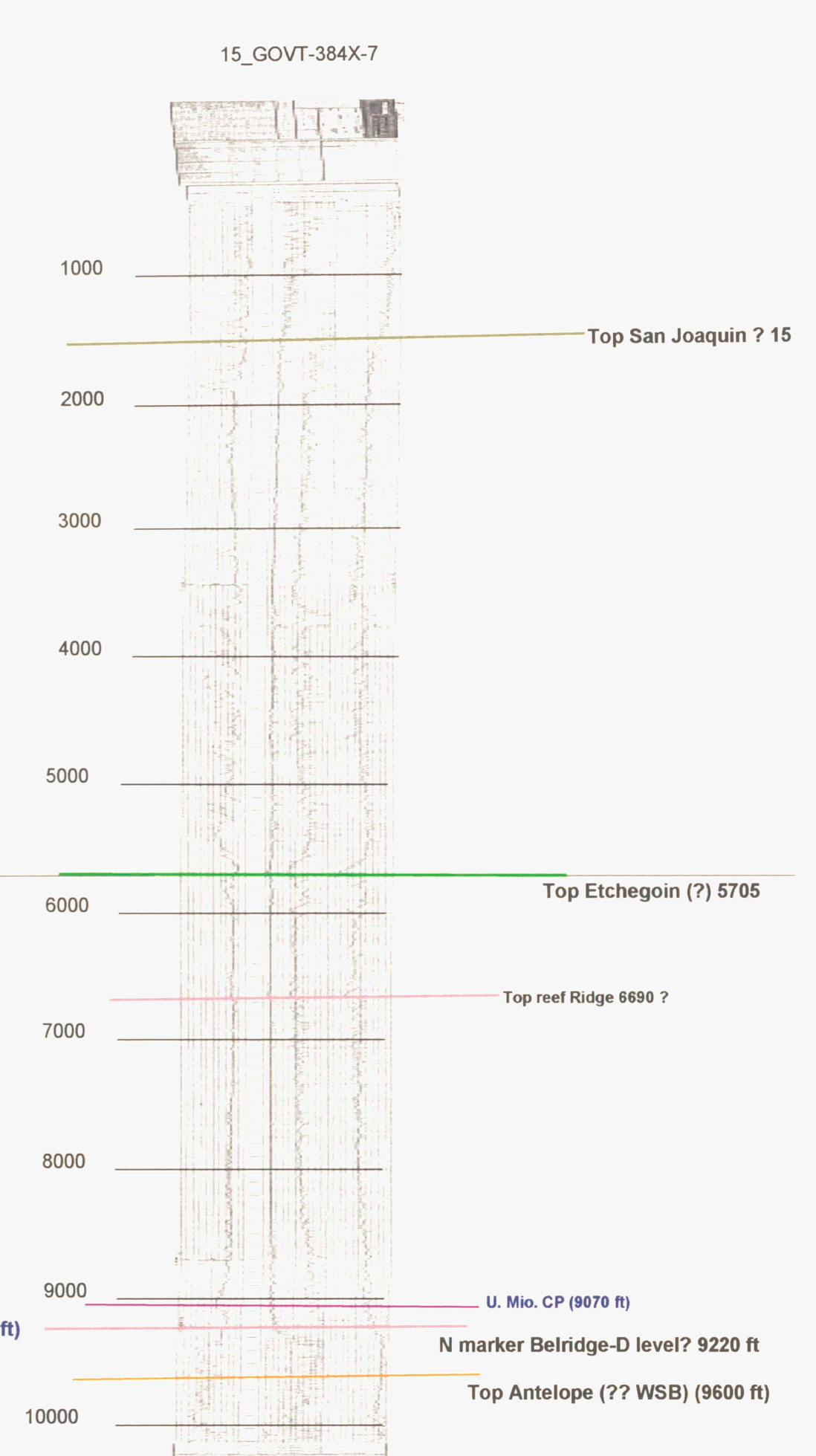
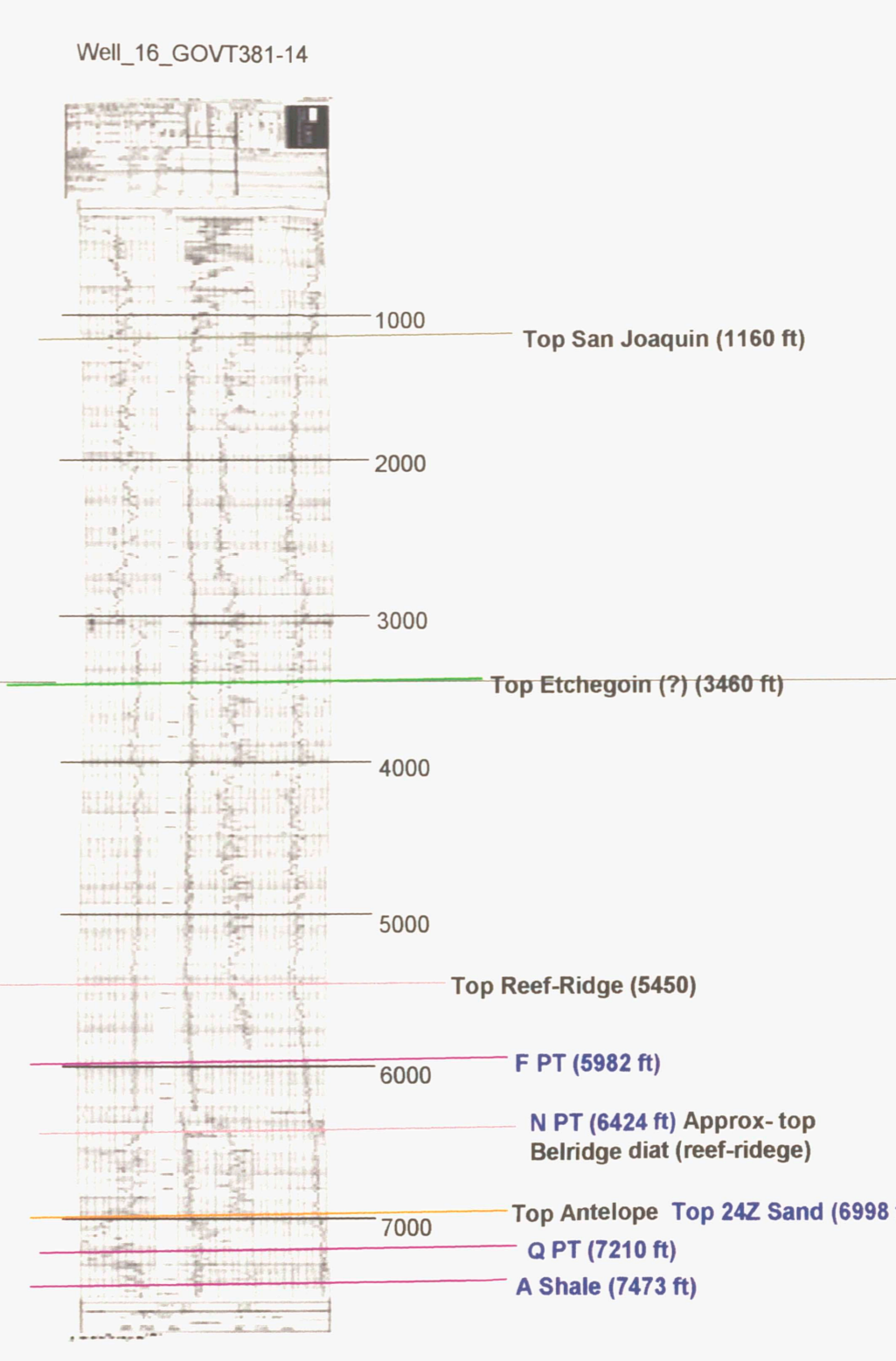
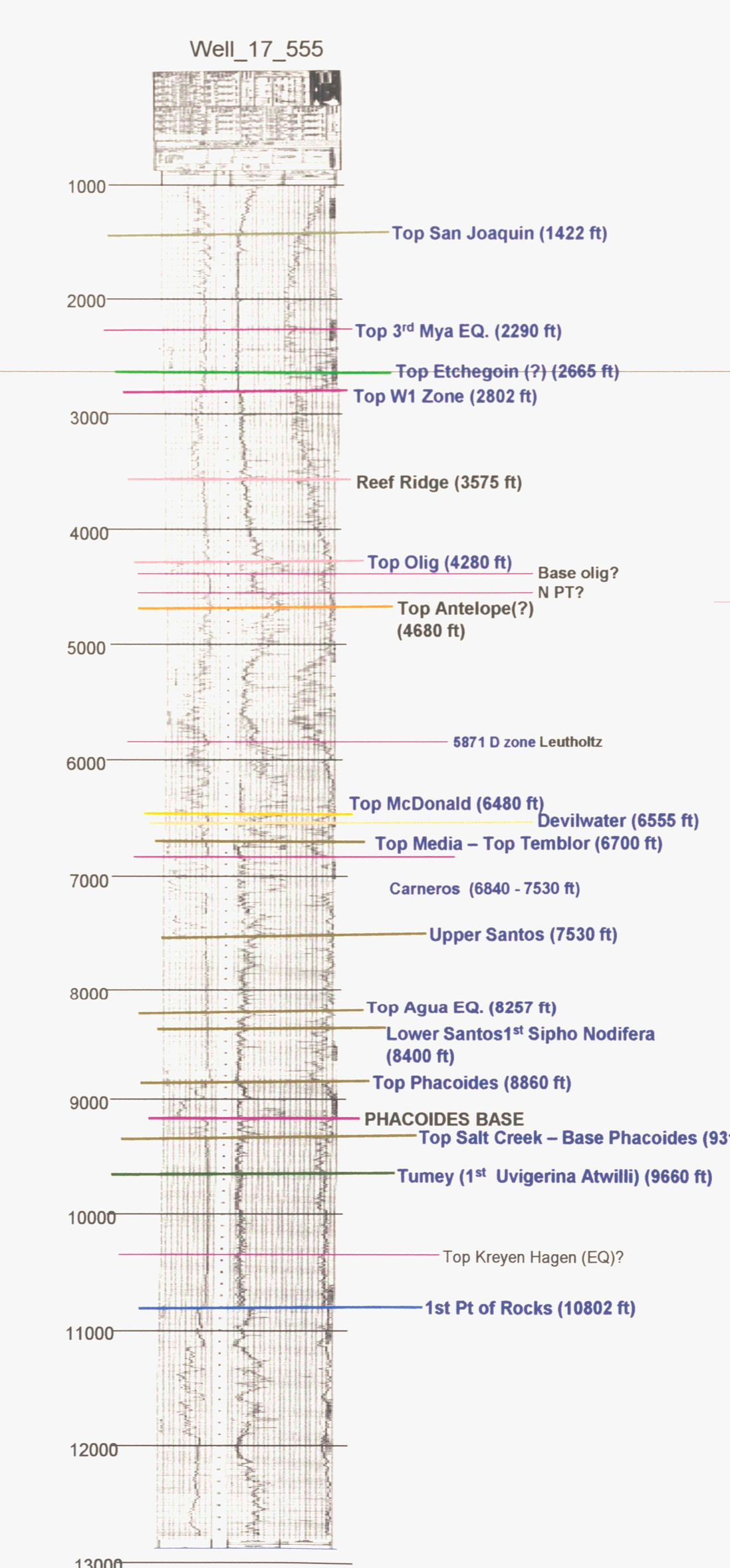
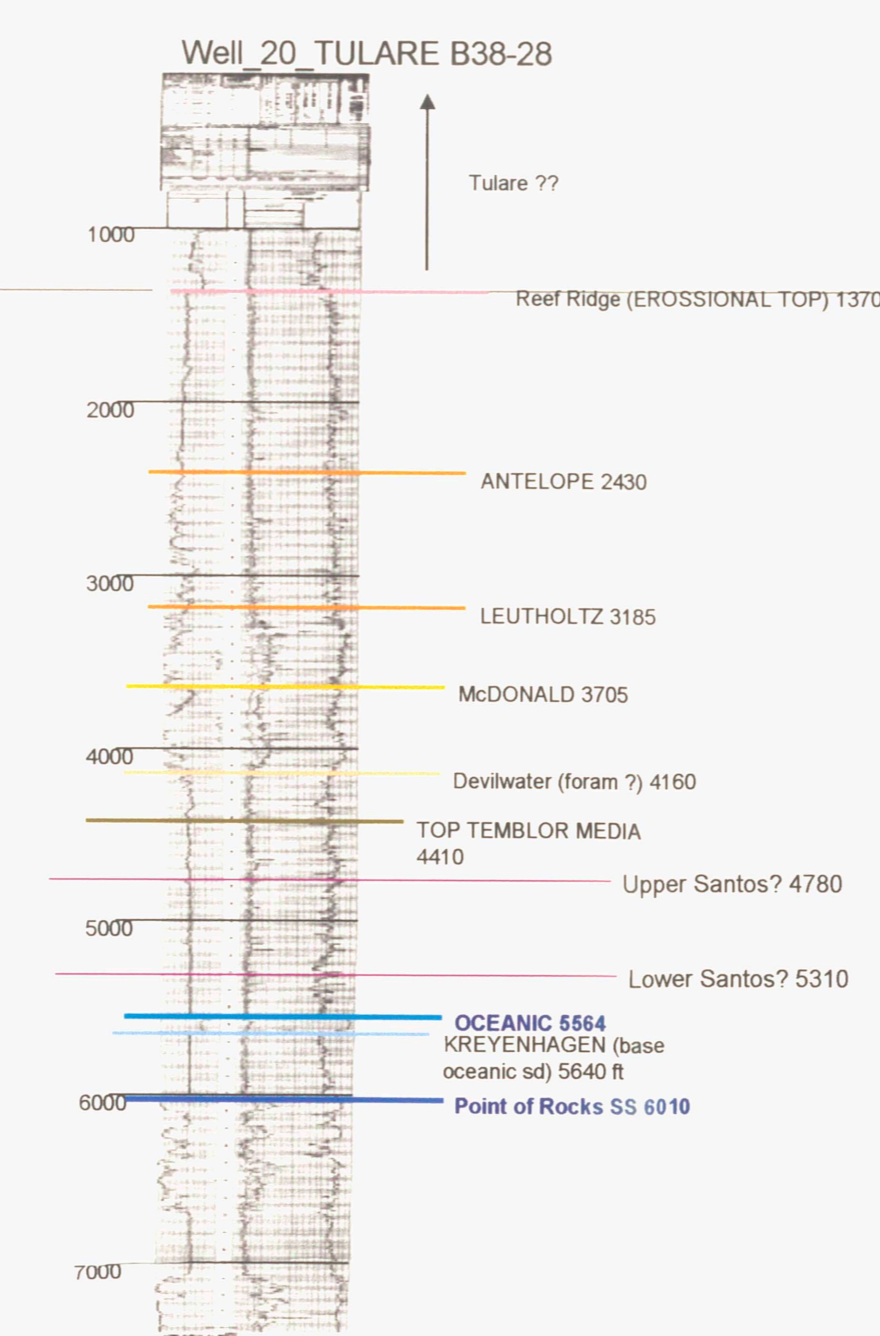
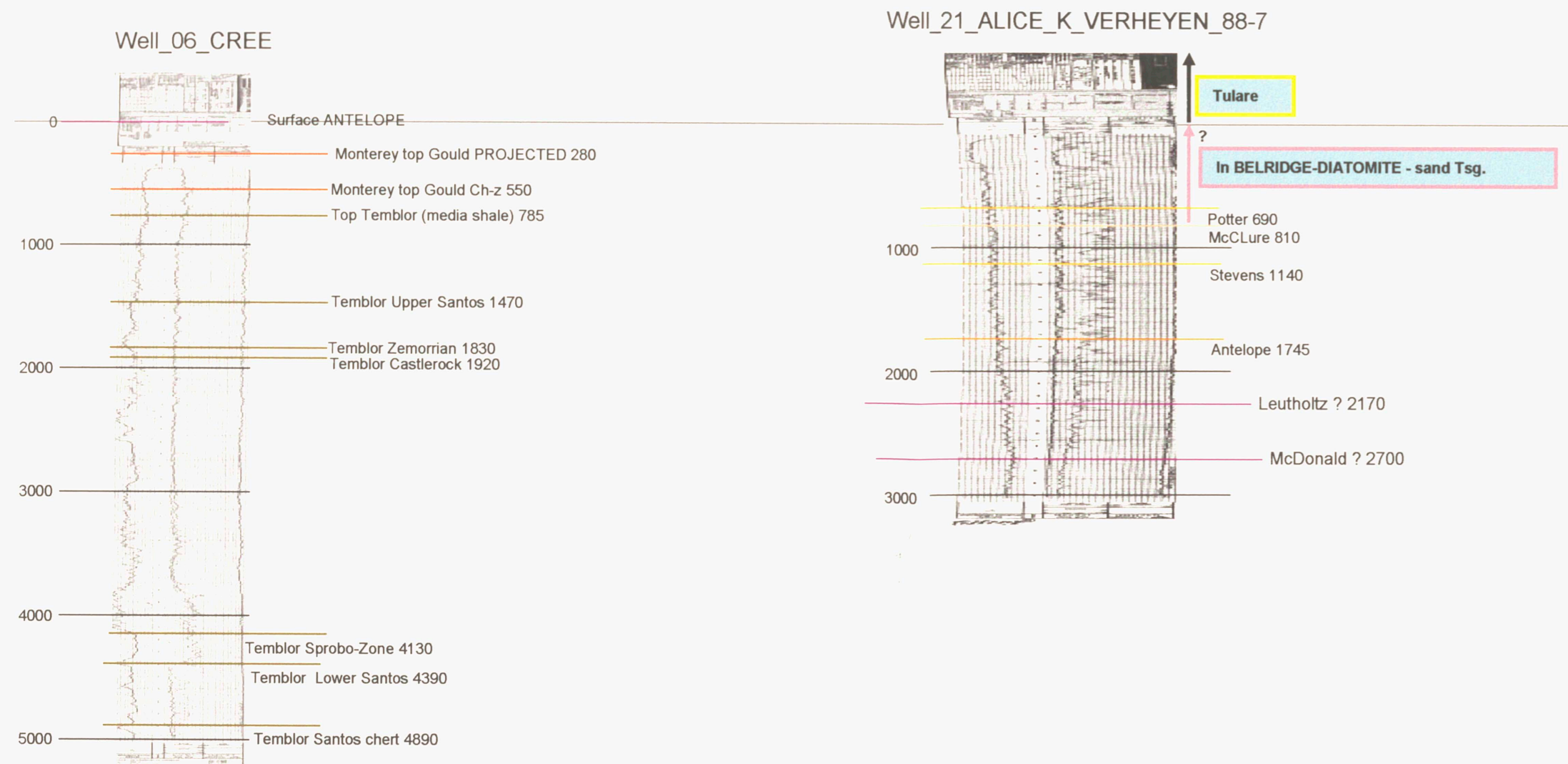
APPENDIX 4

Stratigraphic Cross Section 3



SW

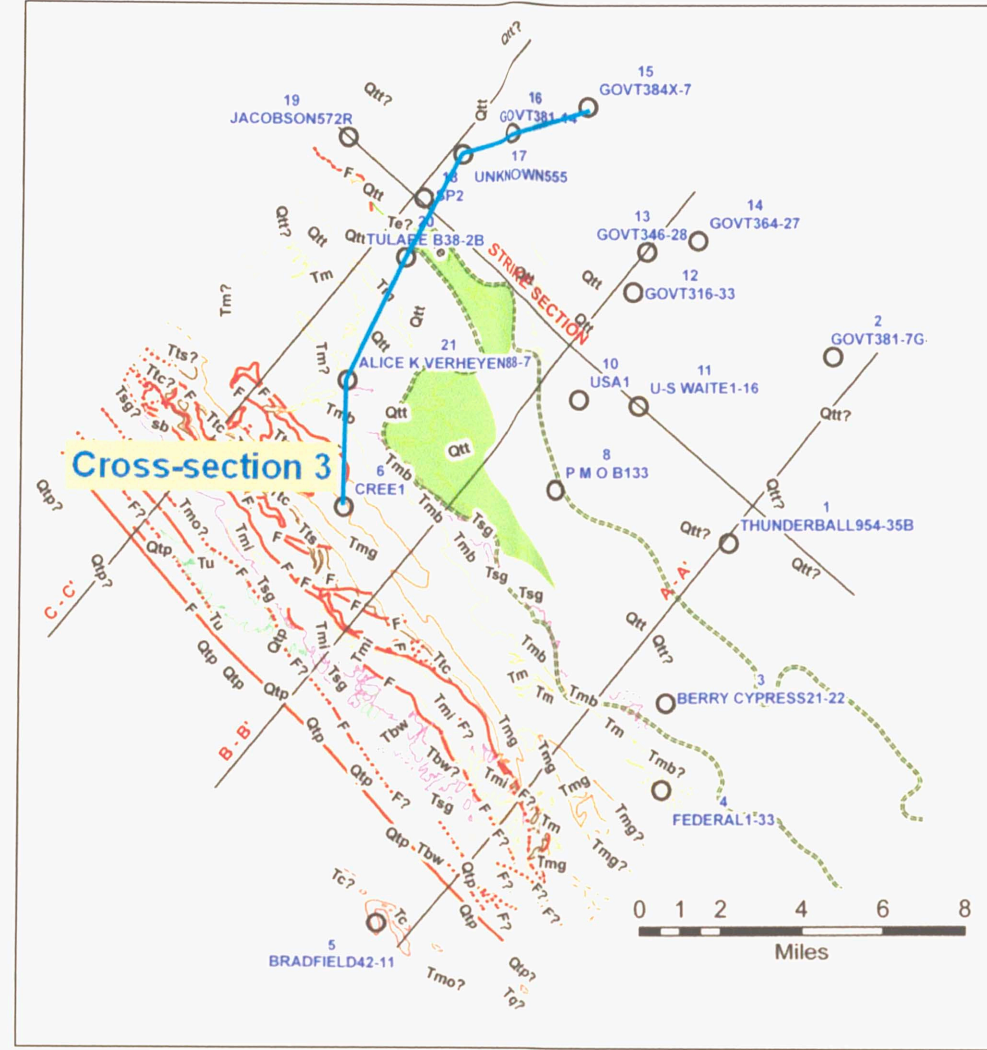
NE



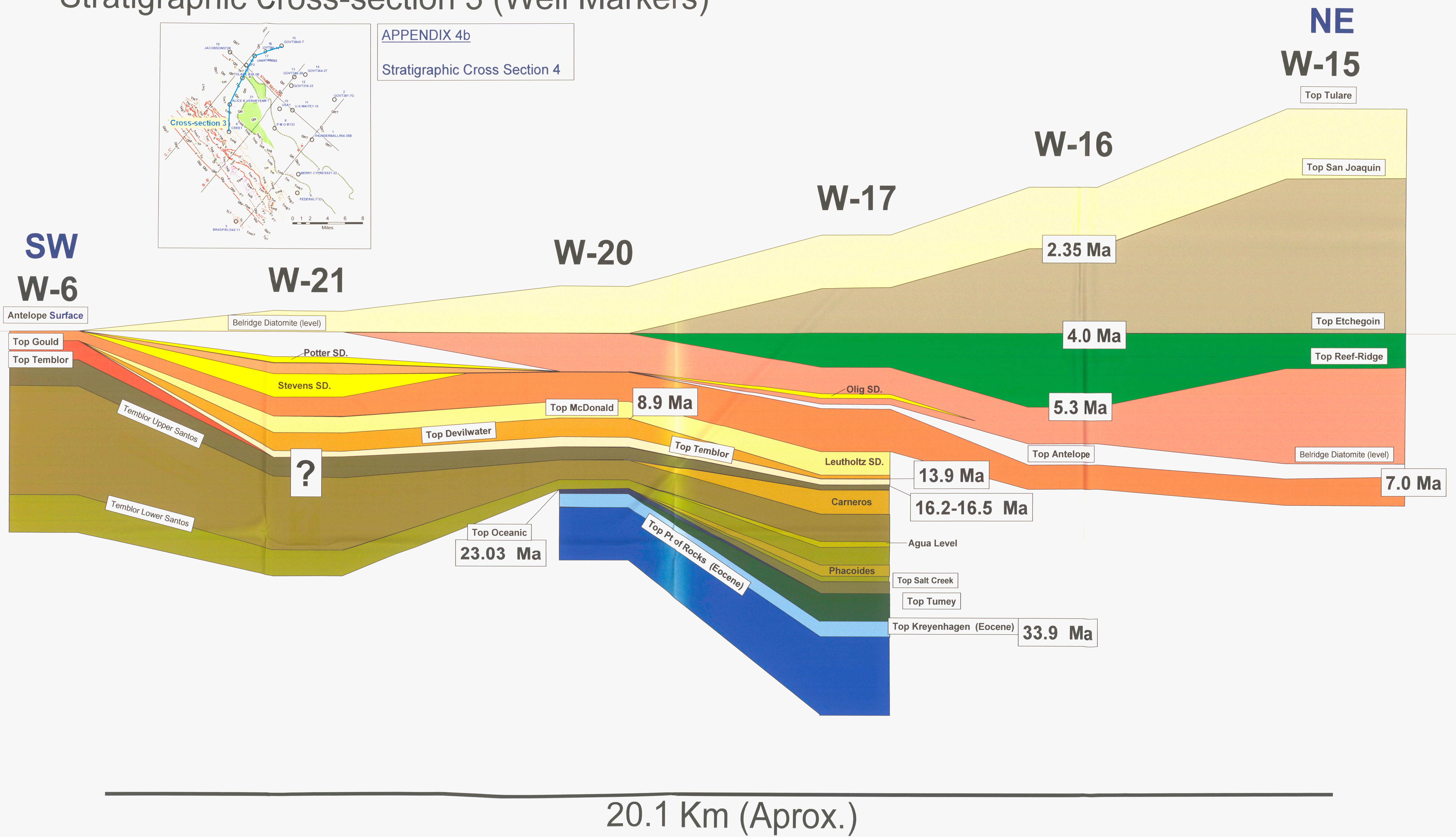
Markers in blue indicate that they were obtained from the well drilling report or completion report.

20.1 Km (Aprox.)

Stratigraphic Cross-section 3 (Well Markers)



APPENDIX 4b
Stratigraphic Cross Section 4

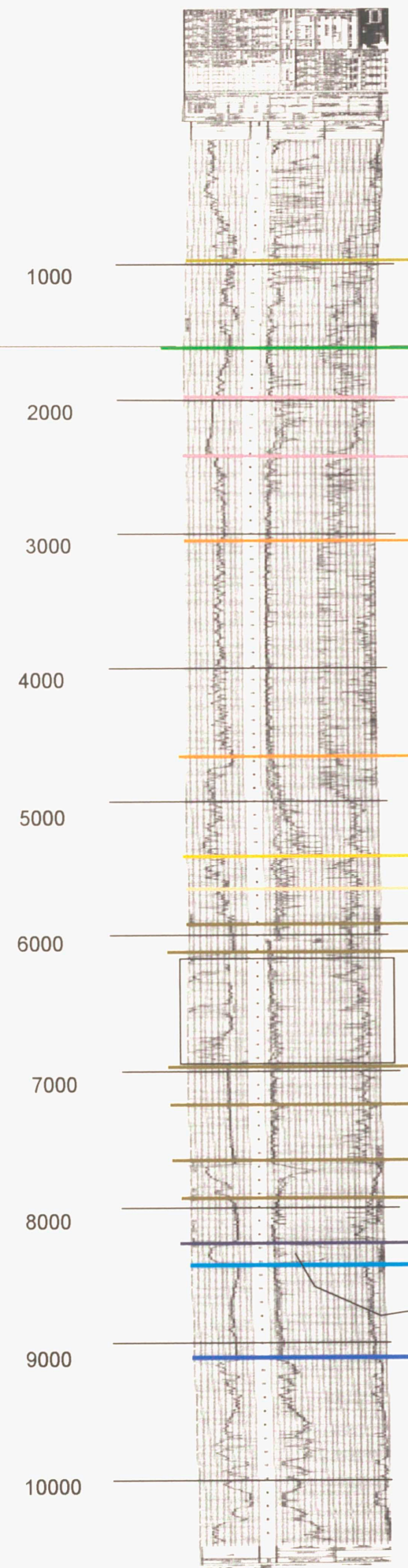


SE

APPENDIX 5
Stratigraphic Cross Section 4

NW

Well_19_JACOBSON_572R



Well_17_555

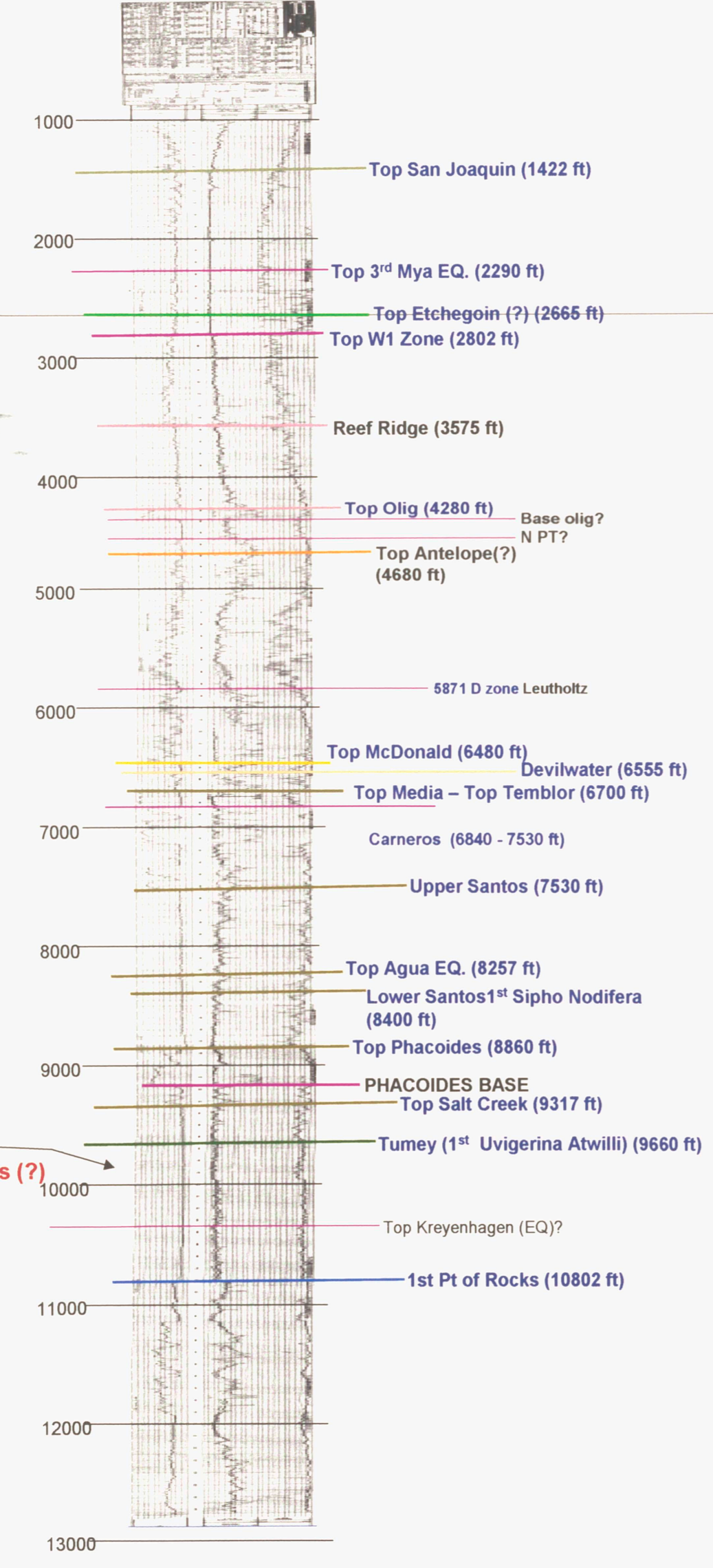

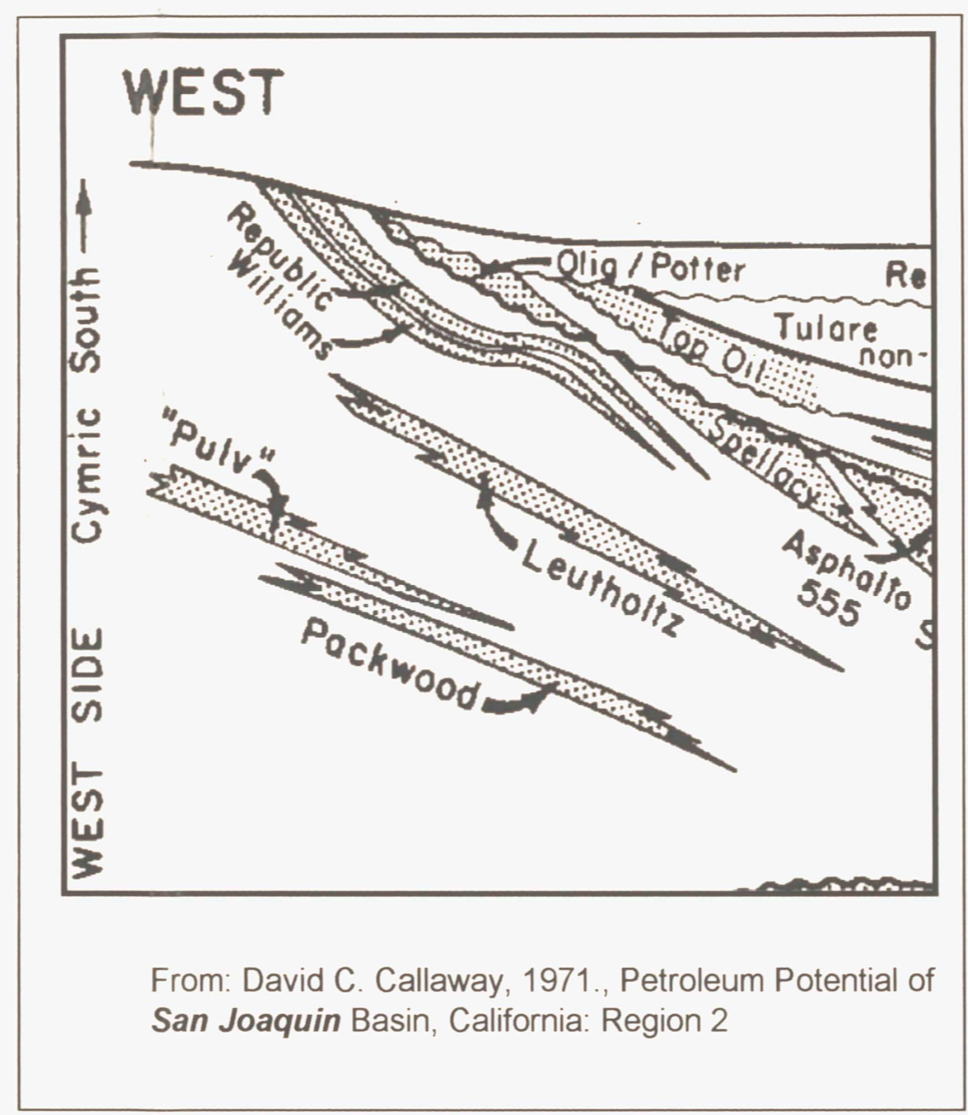
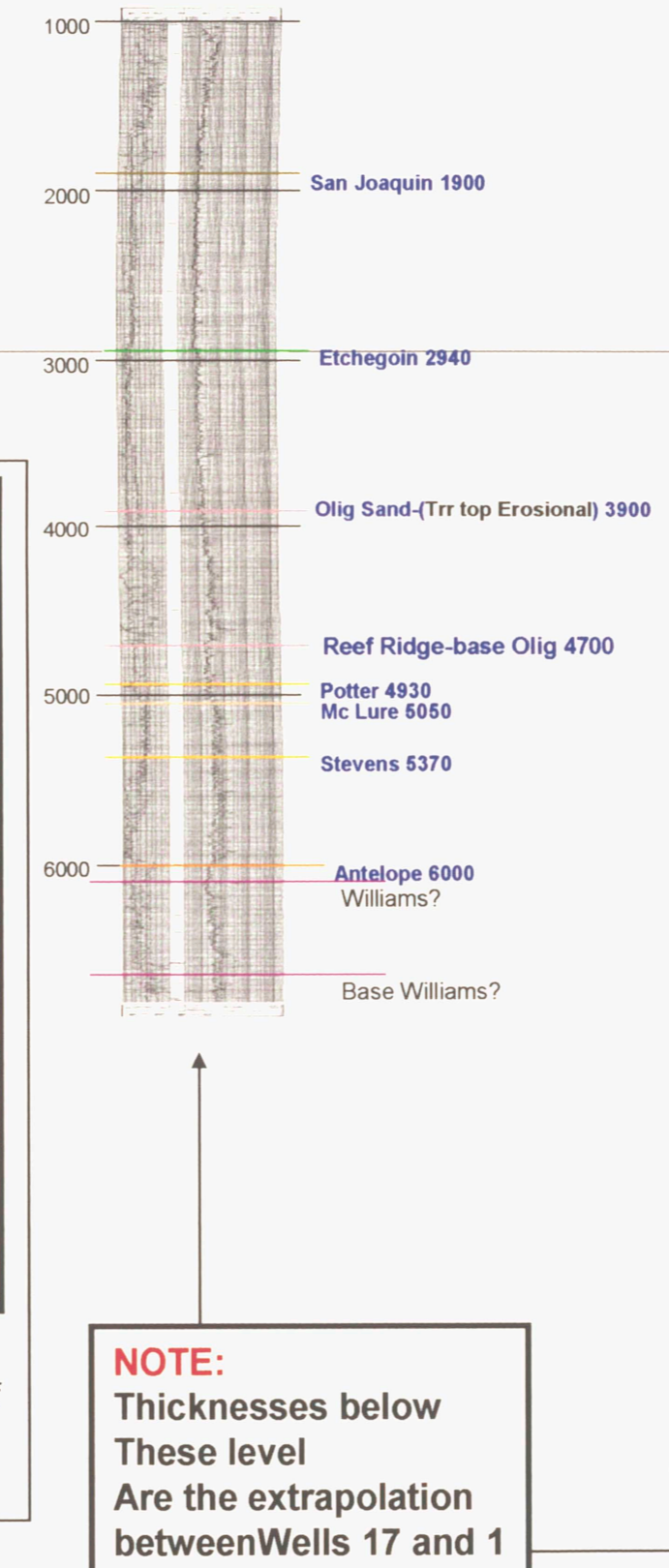


Image Title: **Phacoides anodonta**
Miocene bivalve

Lowermost sandstone member of Temblor Formation in Chico Martinez Creek area is commonly known as "Phacoides reef" (Kleinpell, 1938; Goudkoff, 1943; Curran, 1943) or "Phacoides Sand" (Foss, and Blaisdell, 1968).

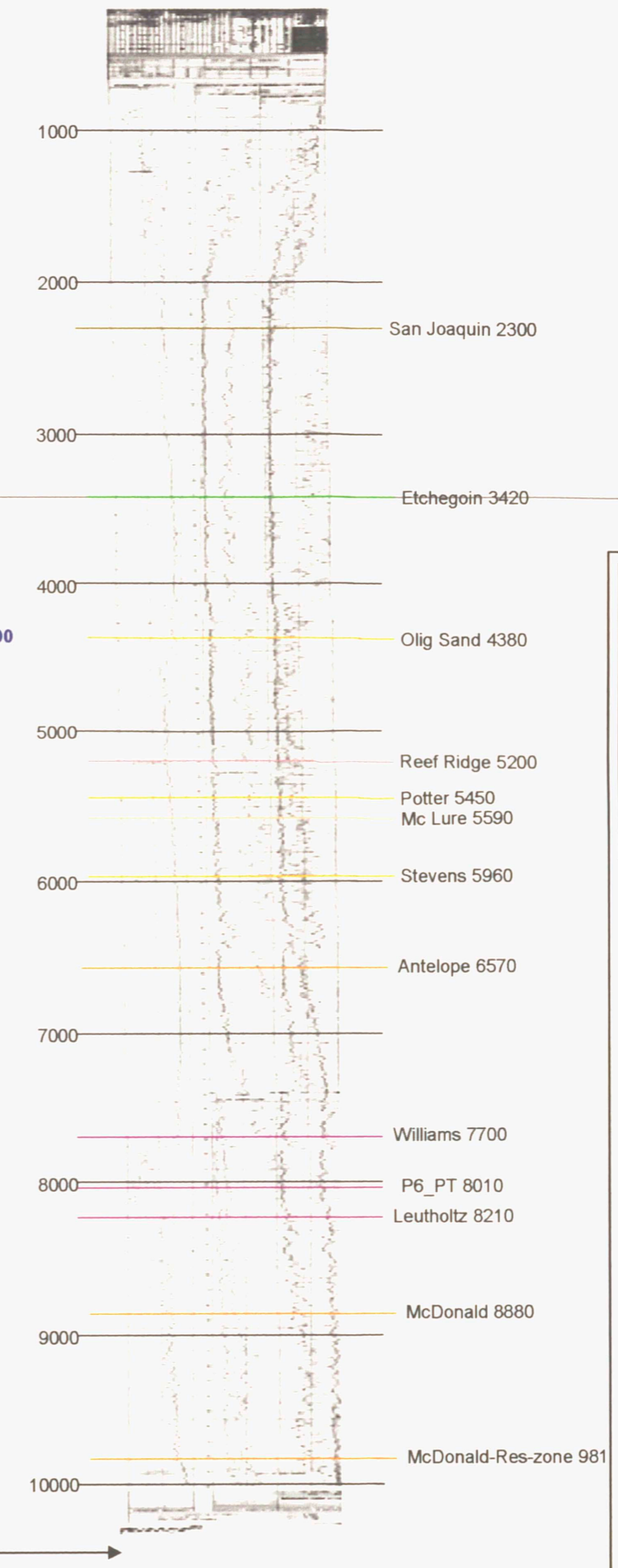


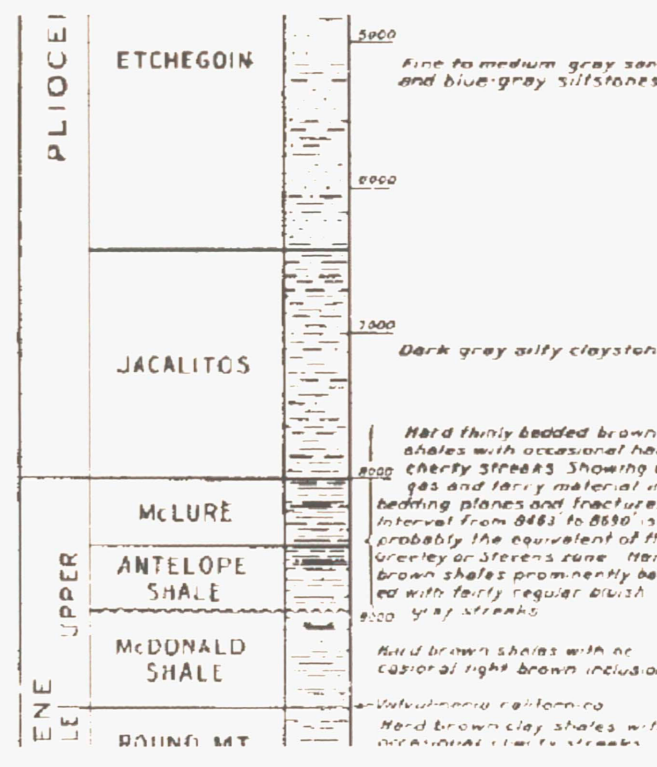
Well_10_USA1-18



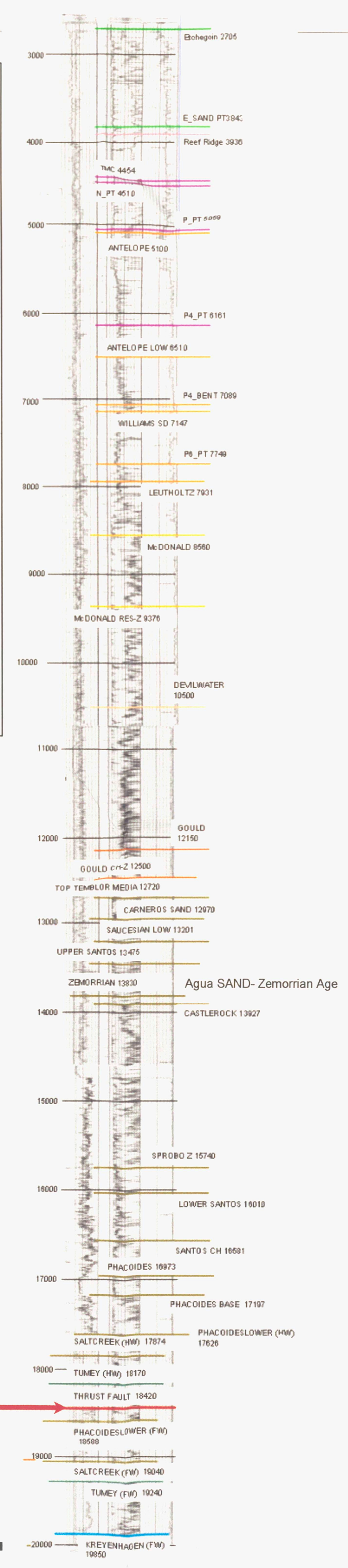
NOTE: Thicknesses below these level are the extrapolation between Wells 17 and 1

Well_11_U-S WAITE 1-16

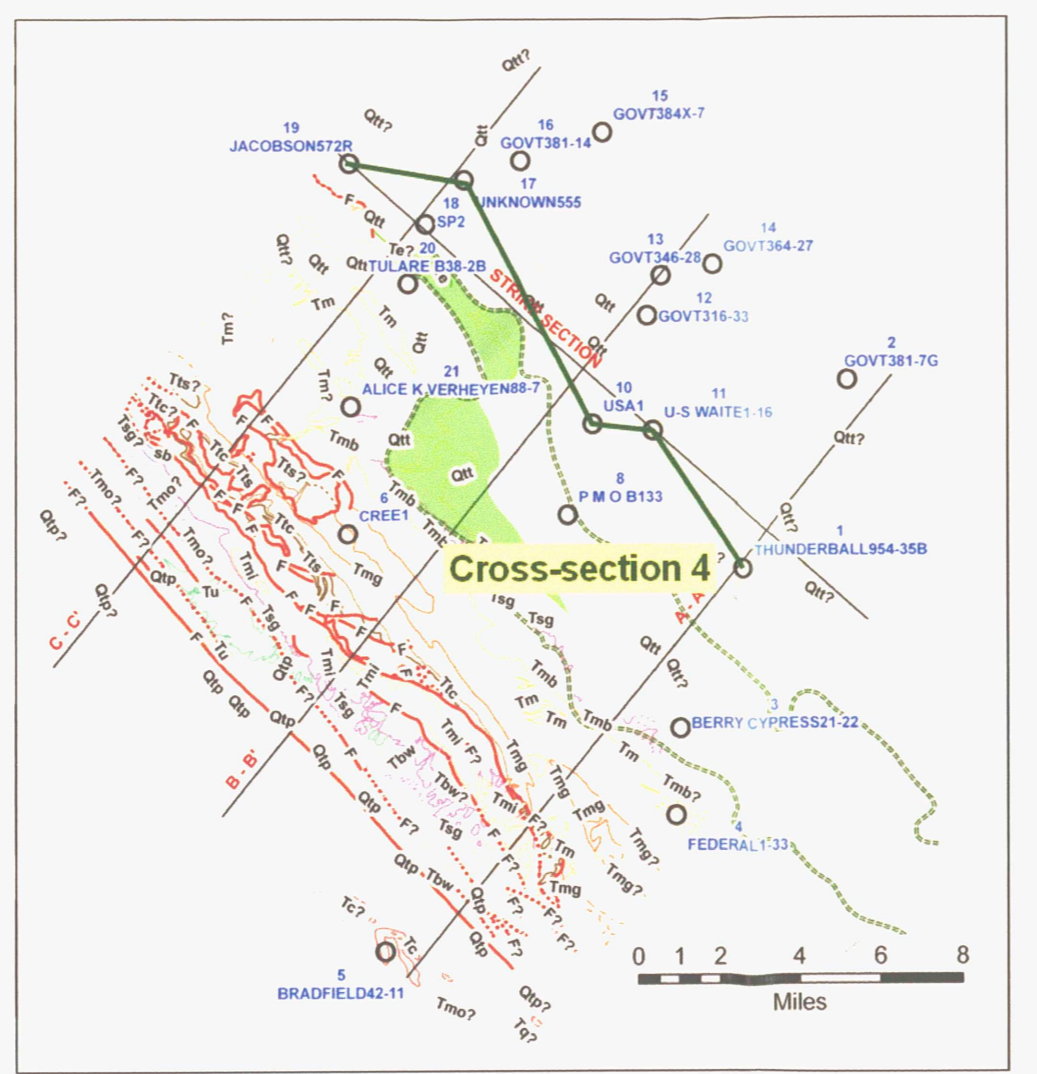


NOTE: Mclure Comprises: Antelope McDonald
***ANTELOPE: For section McClure is Considered The upper part of Antelope

From: Noble, E.B., 1940, Rio Bravo oil field, Kern County, California: American Association of Petroleum Geologists Bulletin, v. 24, no. 7, p. 1330-1353

Well_01_THUNDERBALL954-35B

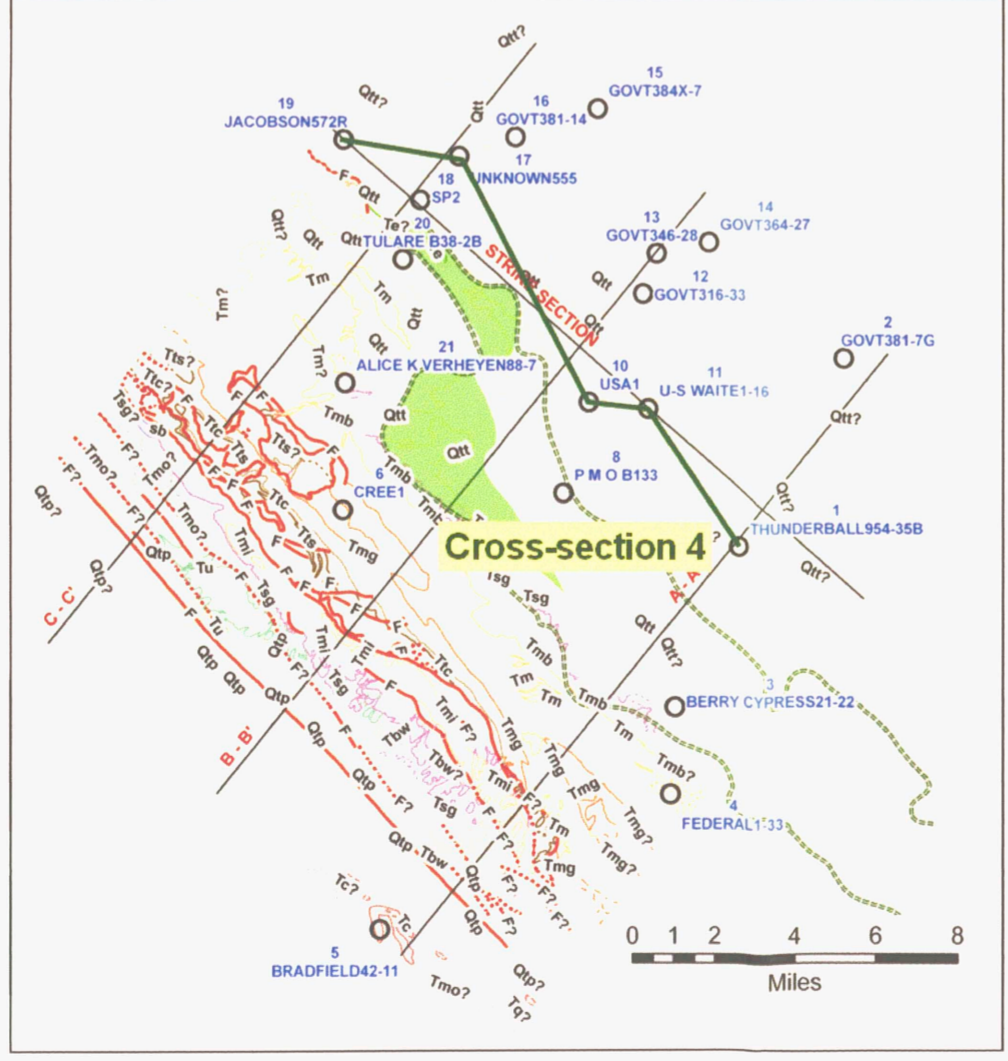
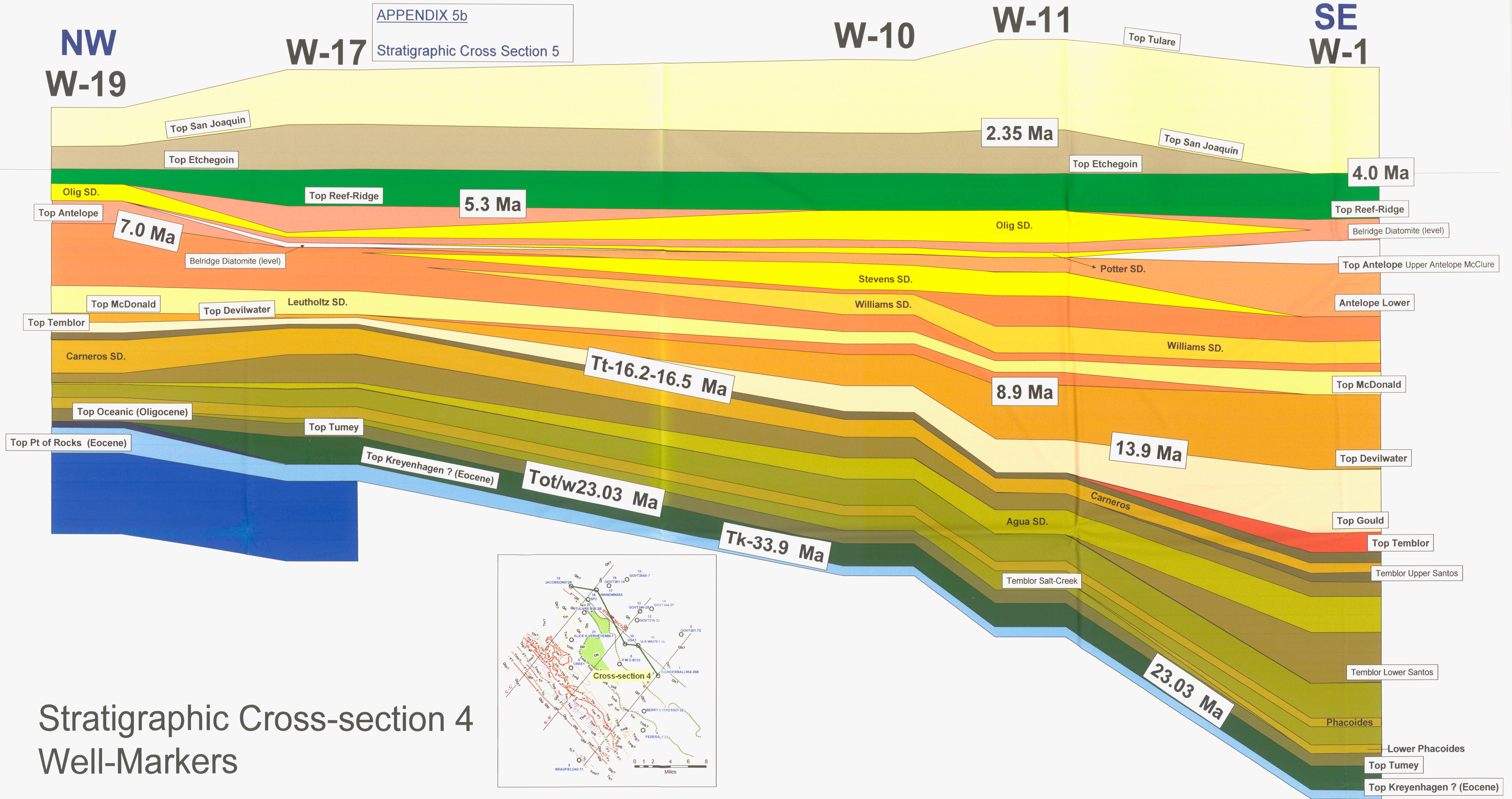


NOTE: For a better stratigraphic representation the fault was not taken in account in this cross section. This will be addressed with the structural cross-sections.



Stratigraphic Cross-section 4
Well-Markers

23.8 Km (Aprox.)

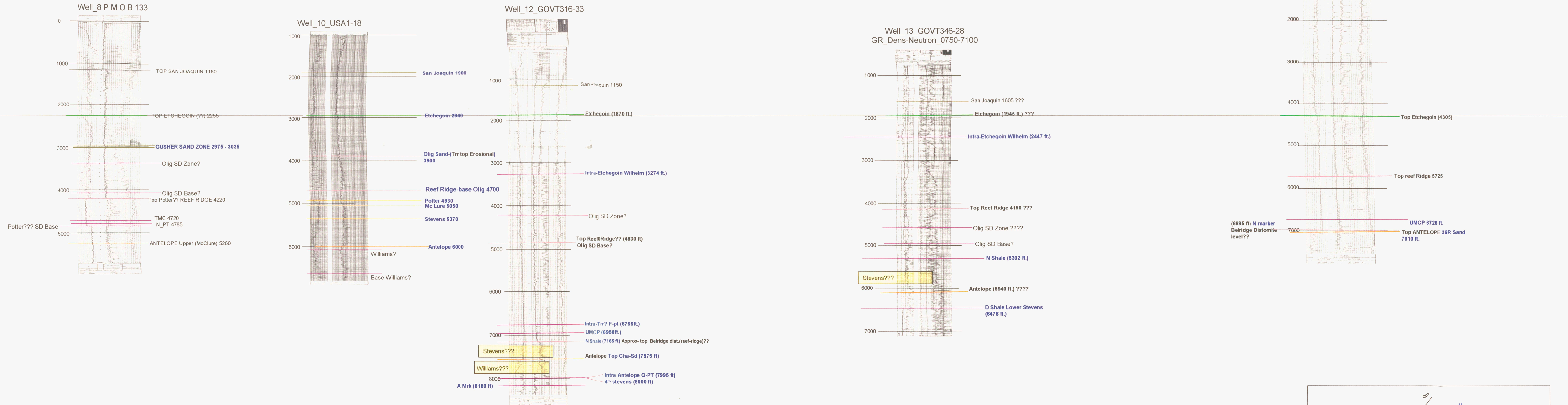


SW

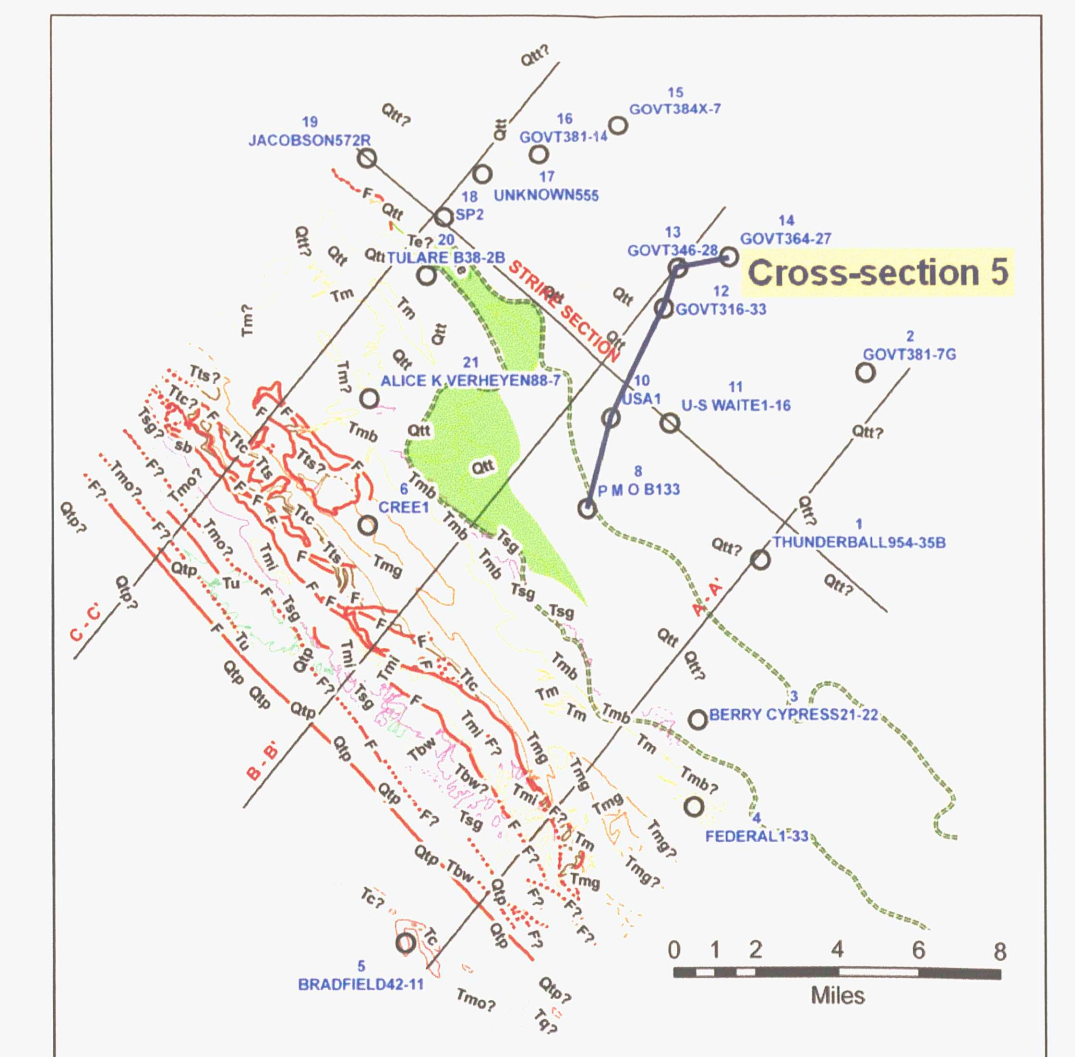
APPENDIX 6

Stratigraphic Cross Section 5

NE



Stratigraphic Cross-section 5 Well-Markers



12 Km (Aprox.)

APPENDIX 6b
Stratigraphic Cross Section 6

SW

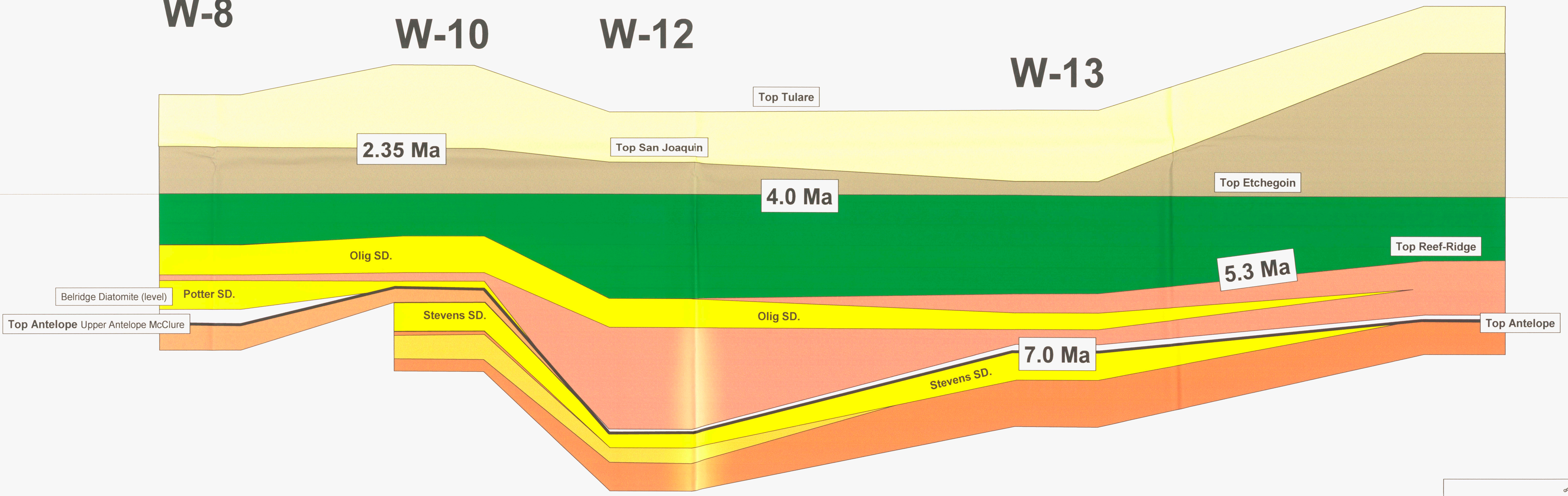
NE
W-14

W-8

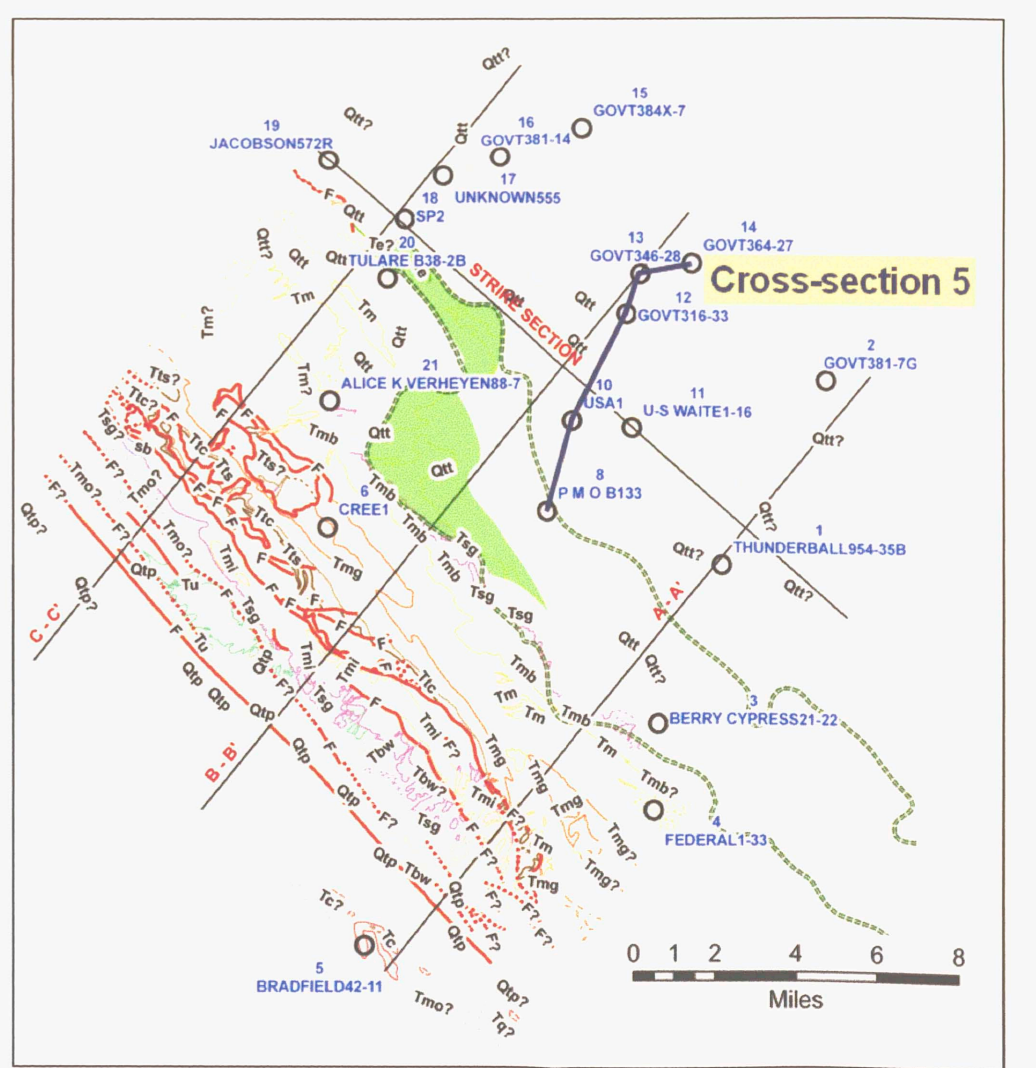
W-10

W-12

W-13



Stratigraphic Cross-section 5



12 Km (Aprox.)

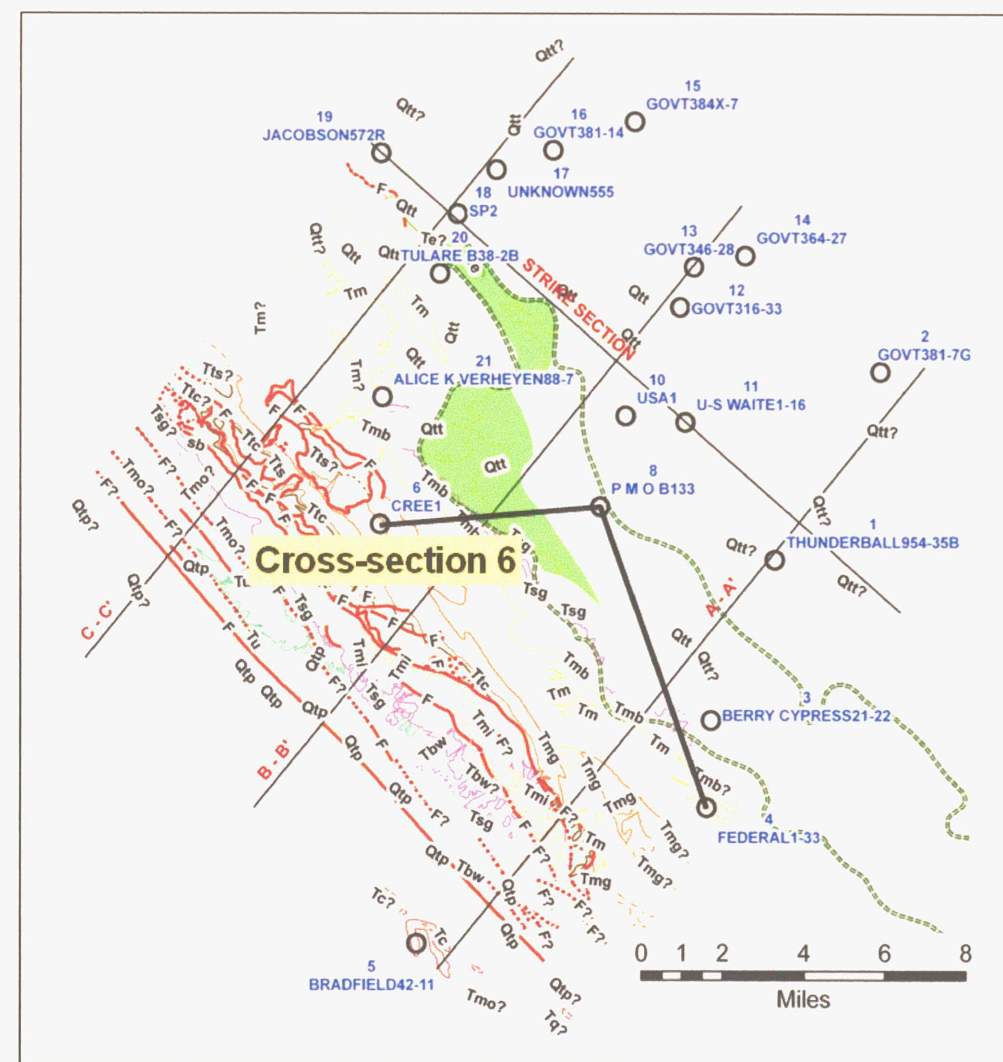
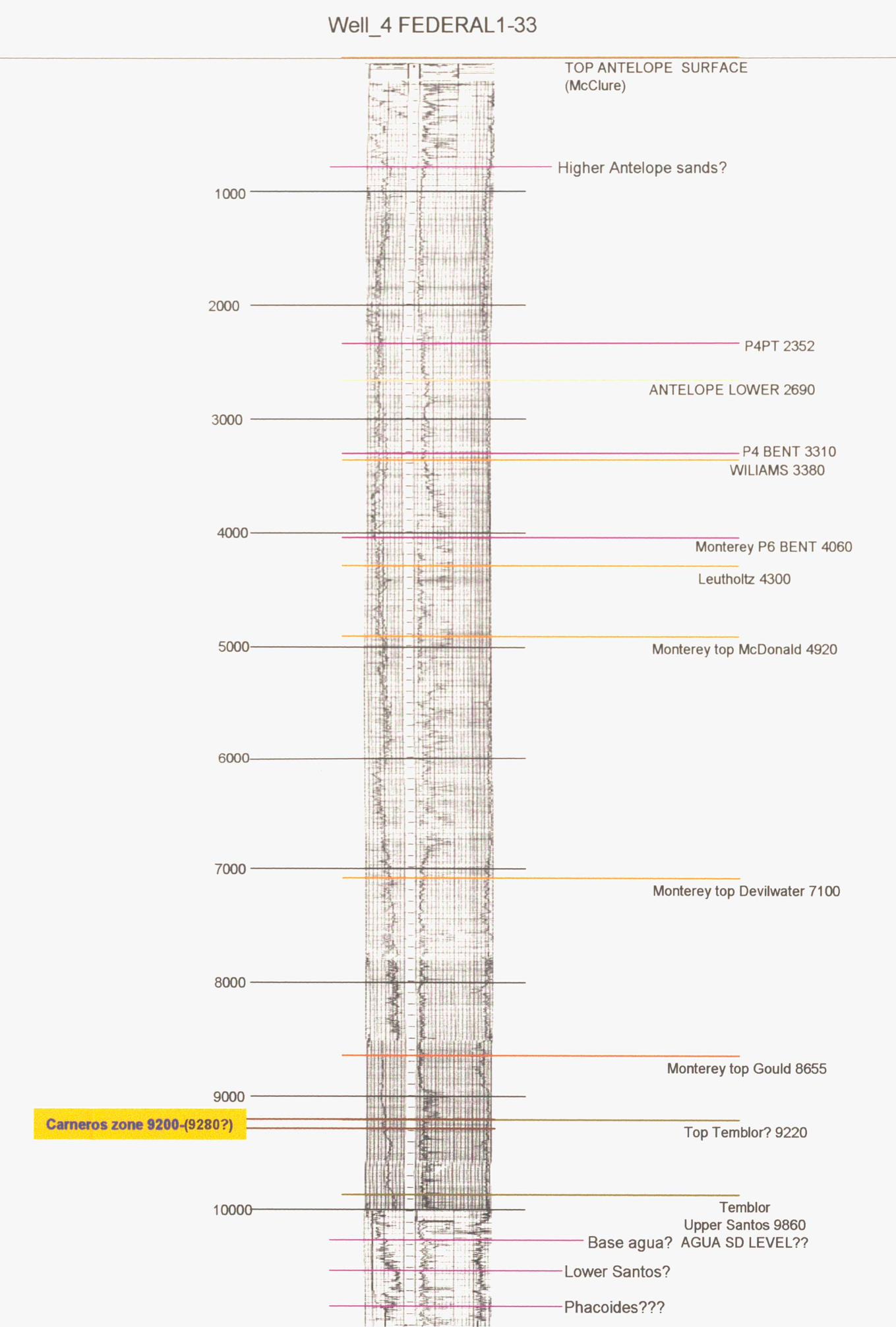
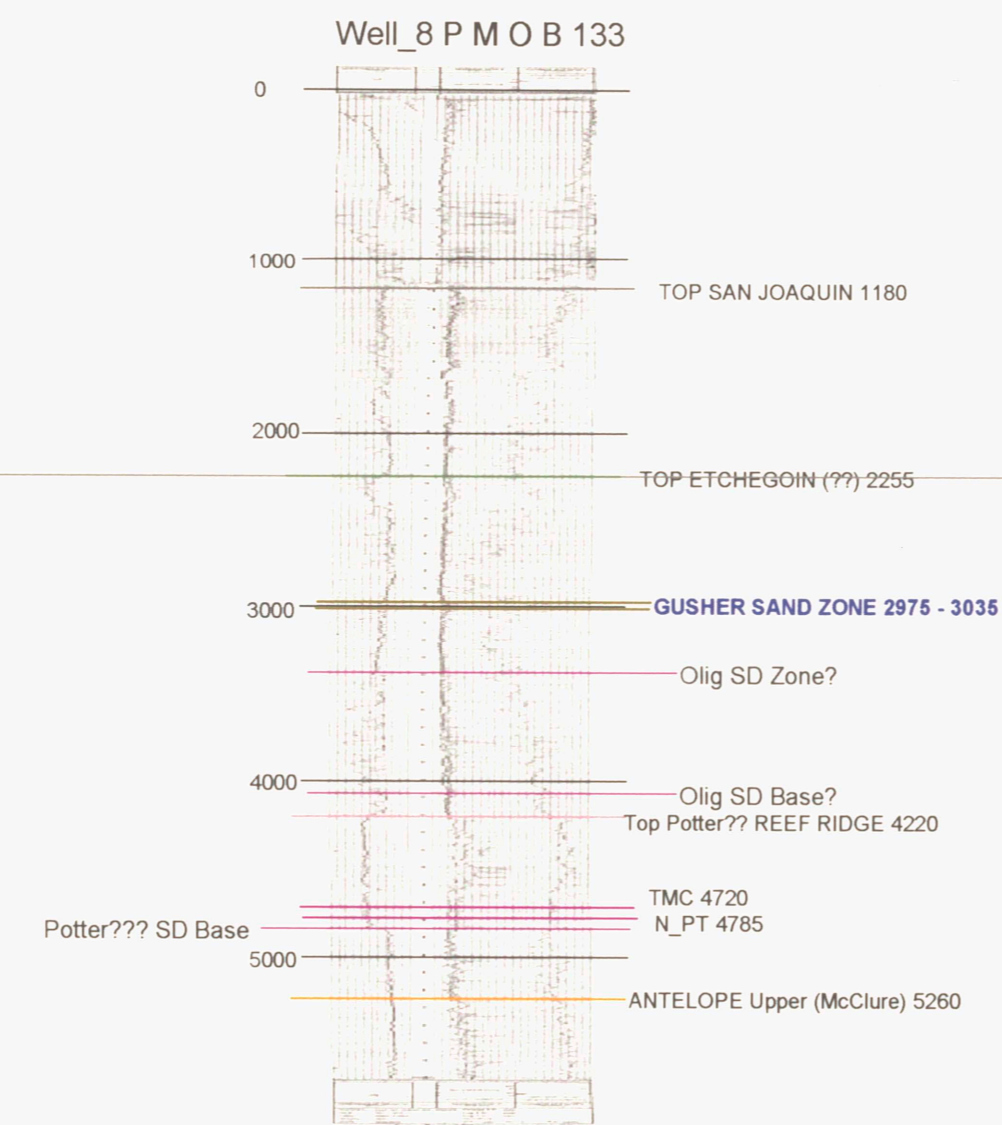
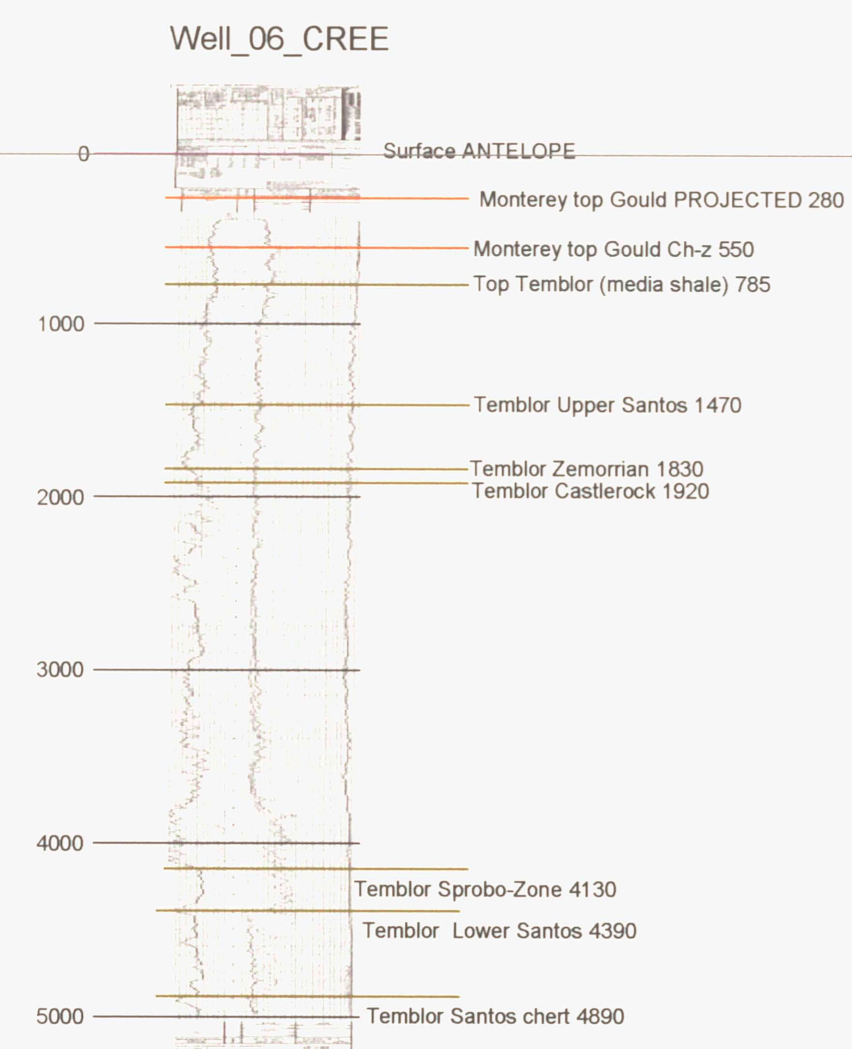
Stratigraphic Cross-section 6 Well-Markers

APPENDIX 7

Stratigraphic Cross Section 6

WNW

SSE



20.6 Km (Aprox.)

Stratigraphic Cross-section 6

Well-Markers

APPENDIX 7b

Stratigraphic Cross Section 7b

WNW

SSE

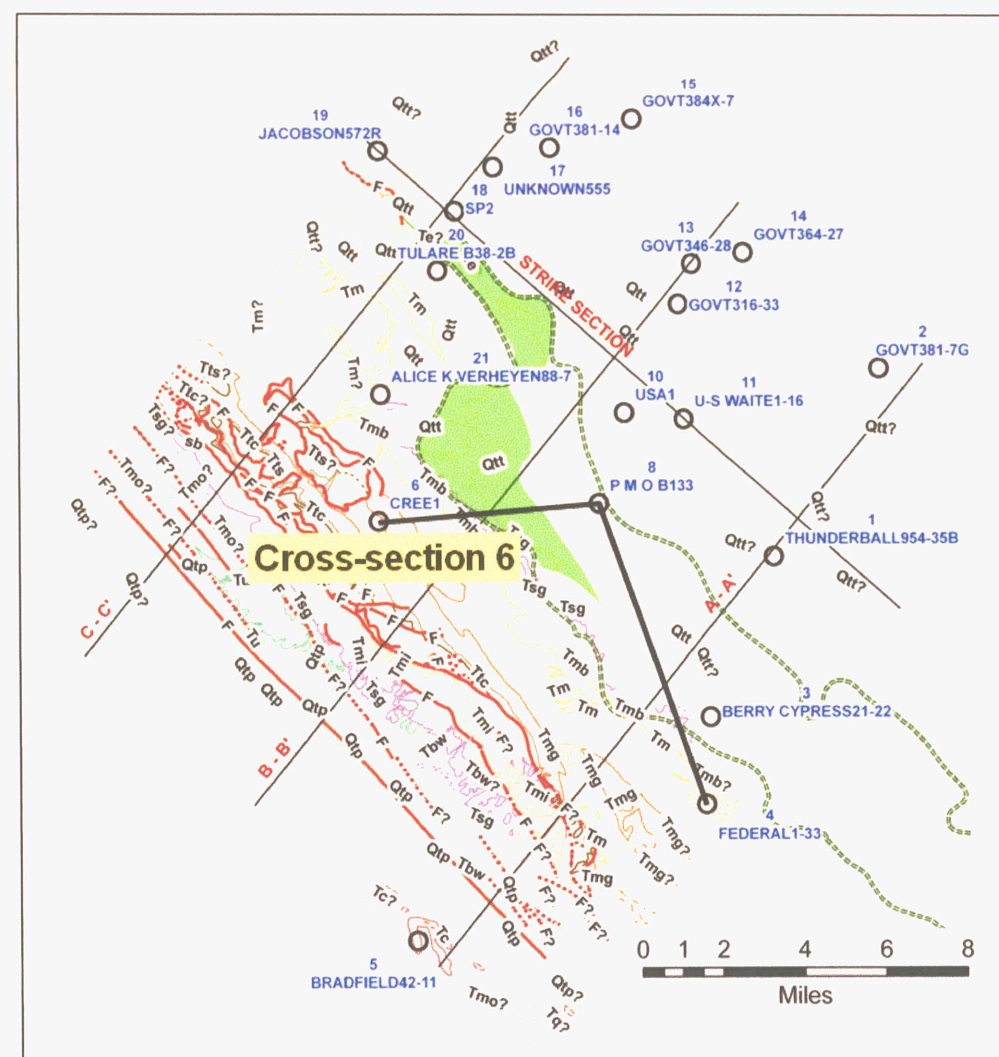
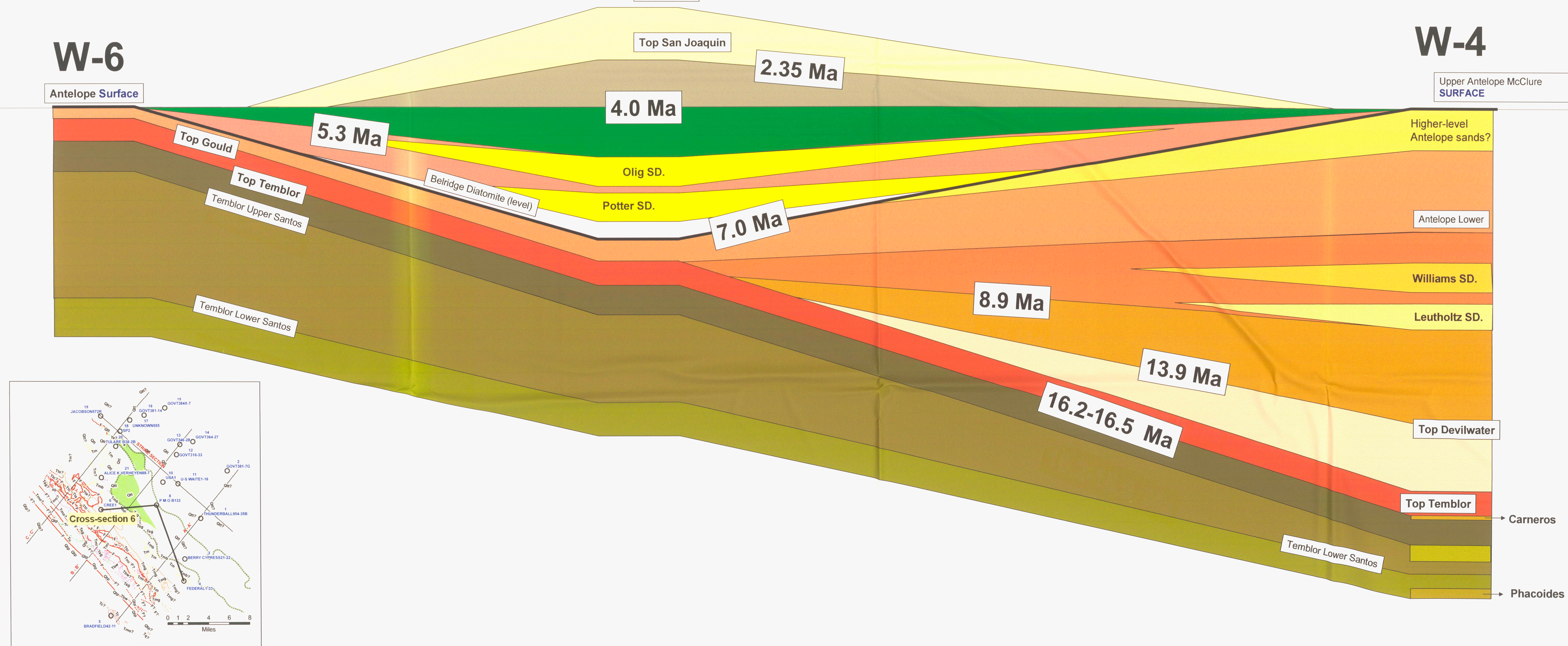
W-6

W-8

W-4

Antelope Surface

Upper Antelope McClure SURFACE



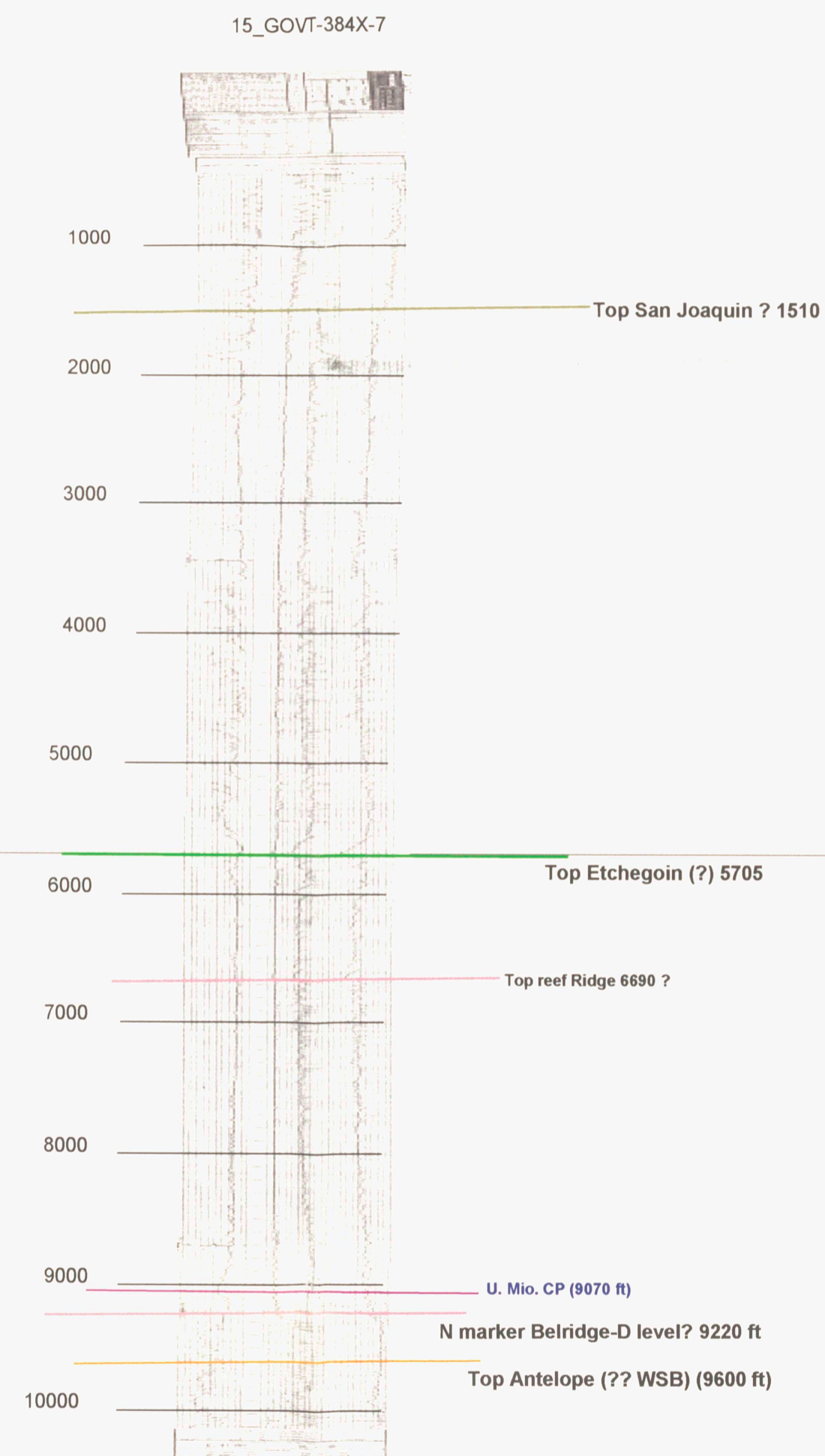
20.6 Km (Aprox.)

Stratigraphic Cross-section 7 Well-Markers

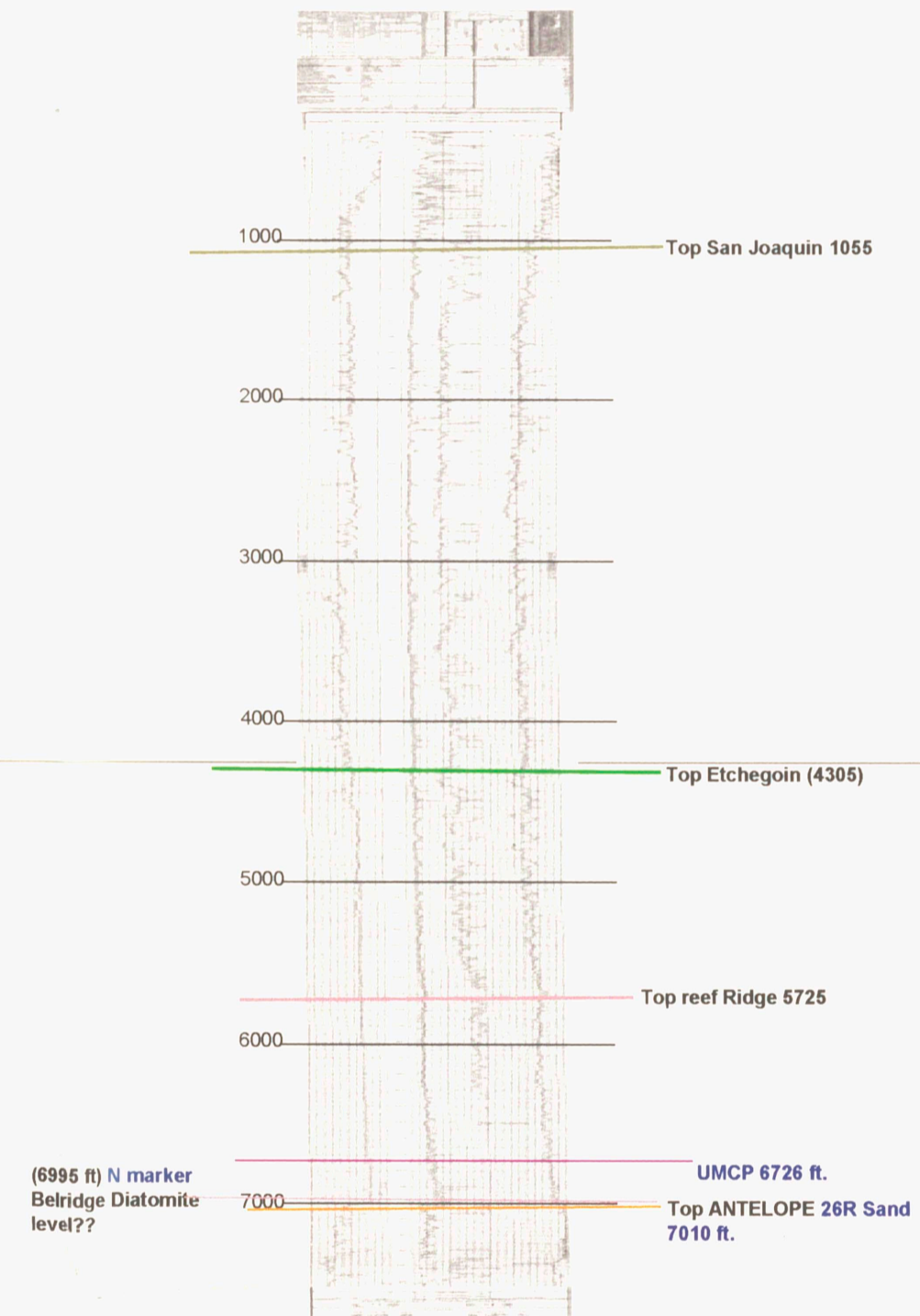
APPENDIX 8

Stratigraphic Cross Section 7

NW

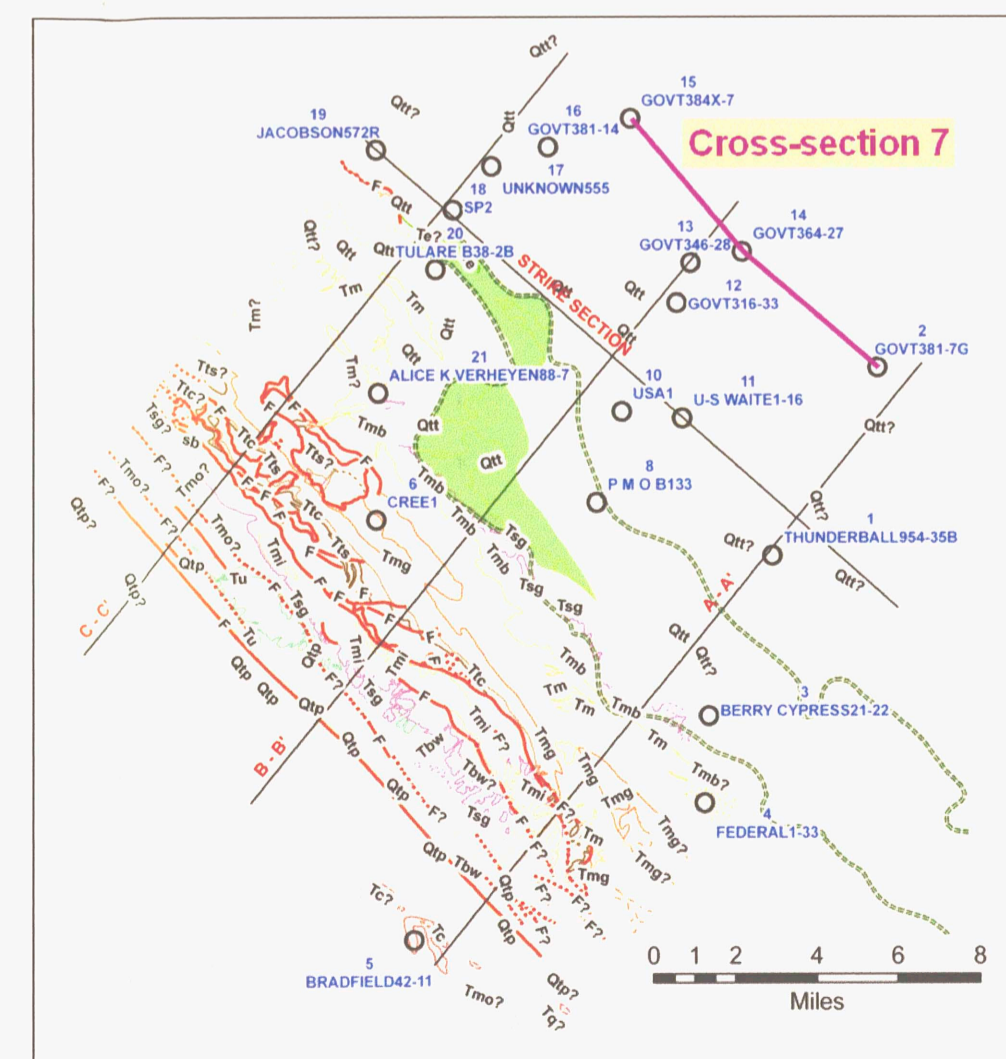
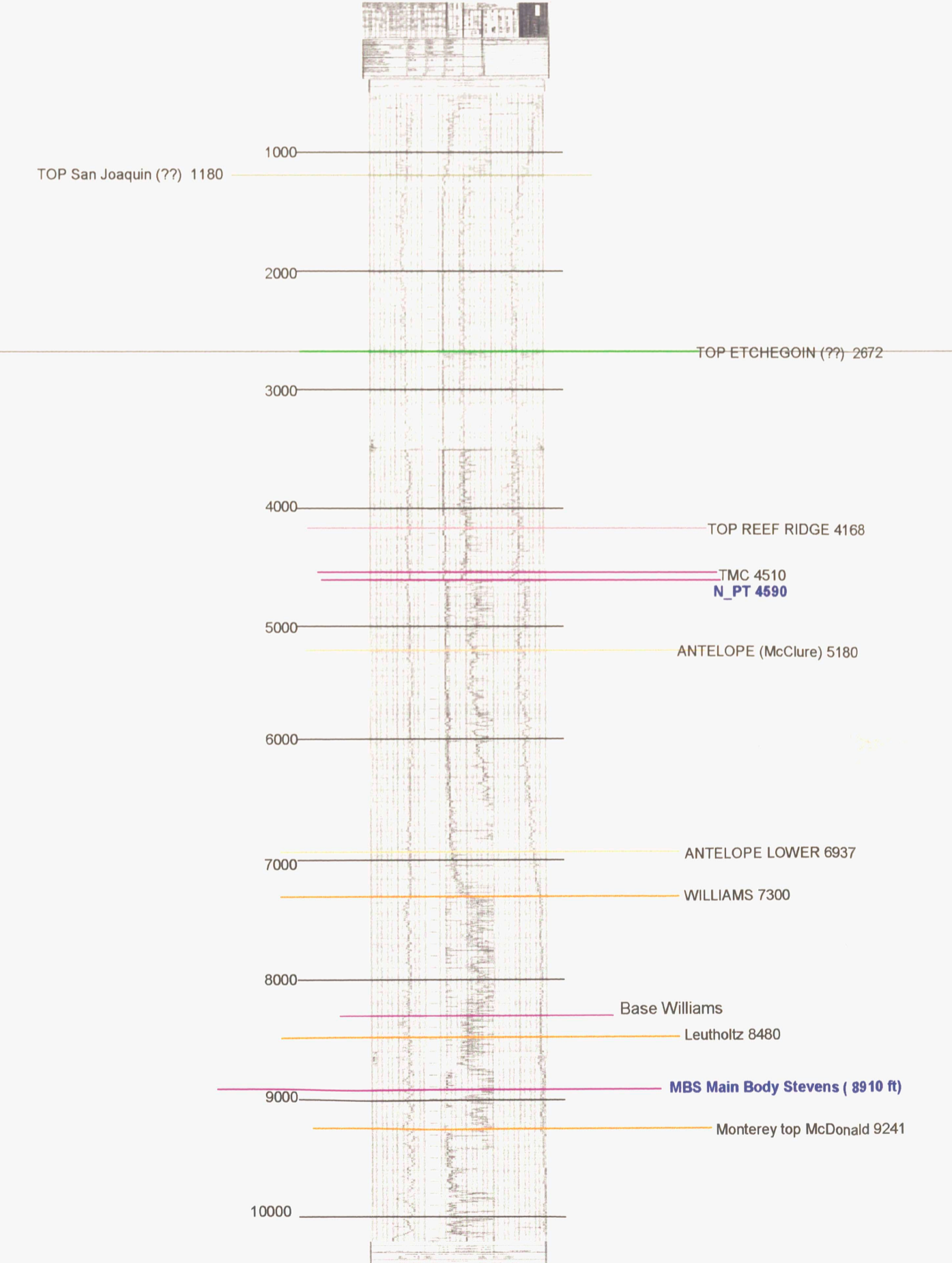


Well_14_GOV364-27



SE

Well_02_GOV381-7G



13.5 Km (Aprox.)

Stratigraphic Cross-section 7

APPENDIX 8b

Stratigraphic Cross Section 8

NW

W-6

W-8

SE

W-2

2.35 Ma

4.0 Ma

5.3 Ma

7.0 Ma

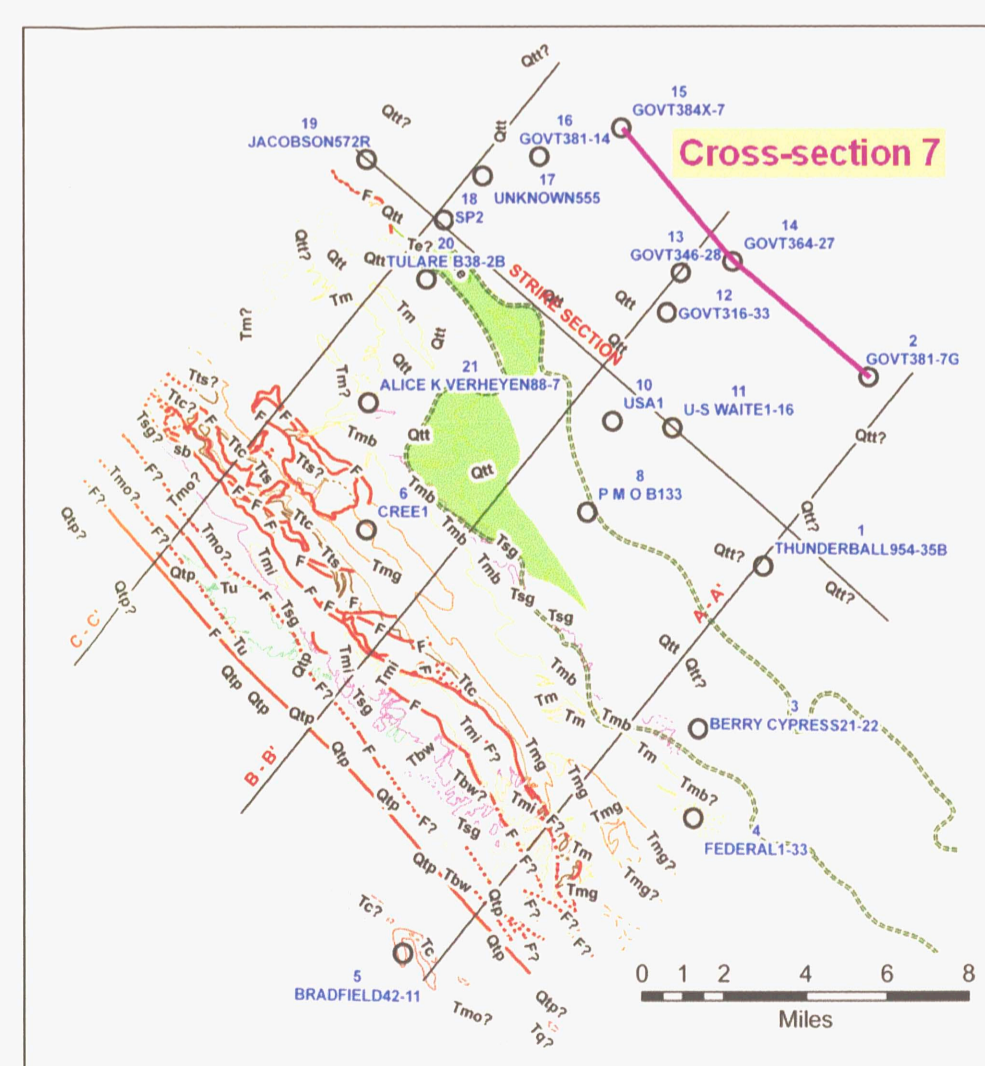
8.9 Ma

Top McDonald

Williams SD.

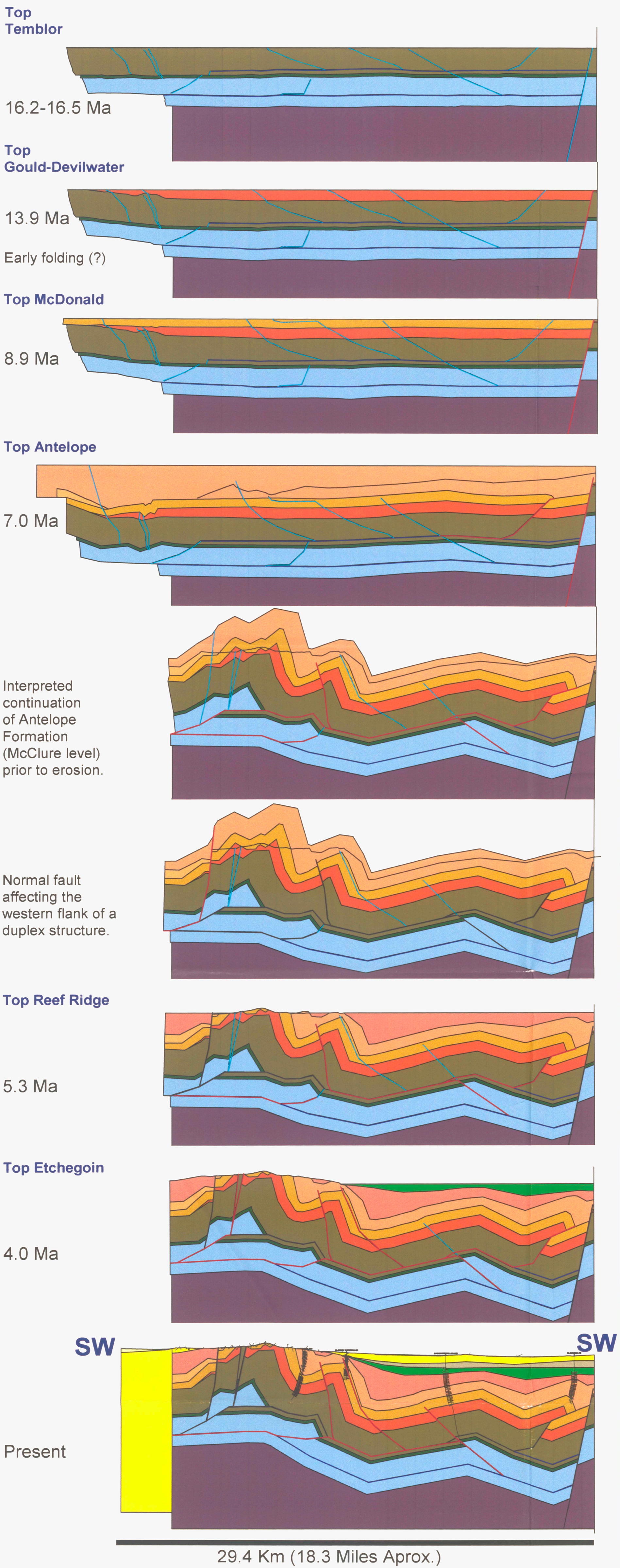
Leutholtz SD.

Stevens SD.



13.5 Km (Aprox.)

Restoration structural cross-section A-A'

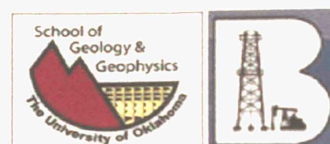


APPENDIX 9

Reconstruction Cross Section AA'

W. Sebastian Bayer (The University of Oklahoma)
28 September 2006

Supervised By:
Dr Roger Slatt
Dr Shankar Mitra
Dr James Forgotson



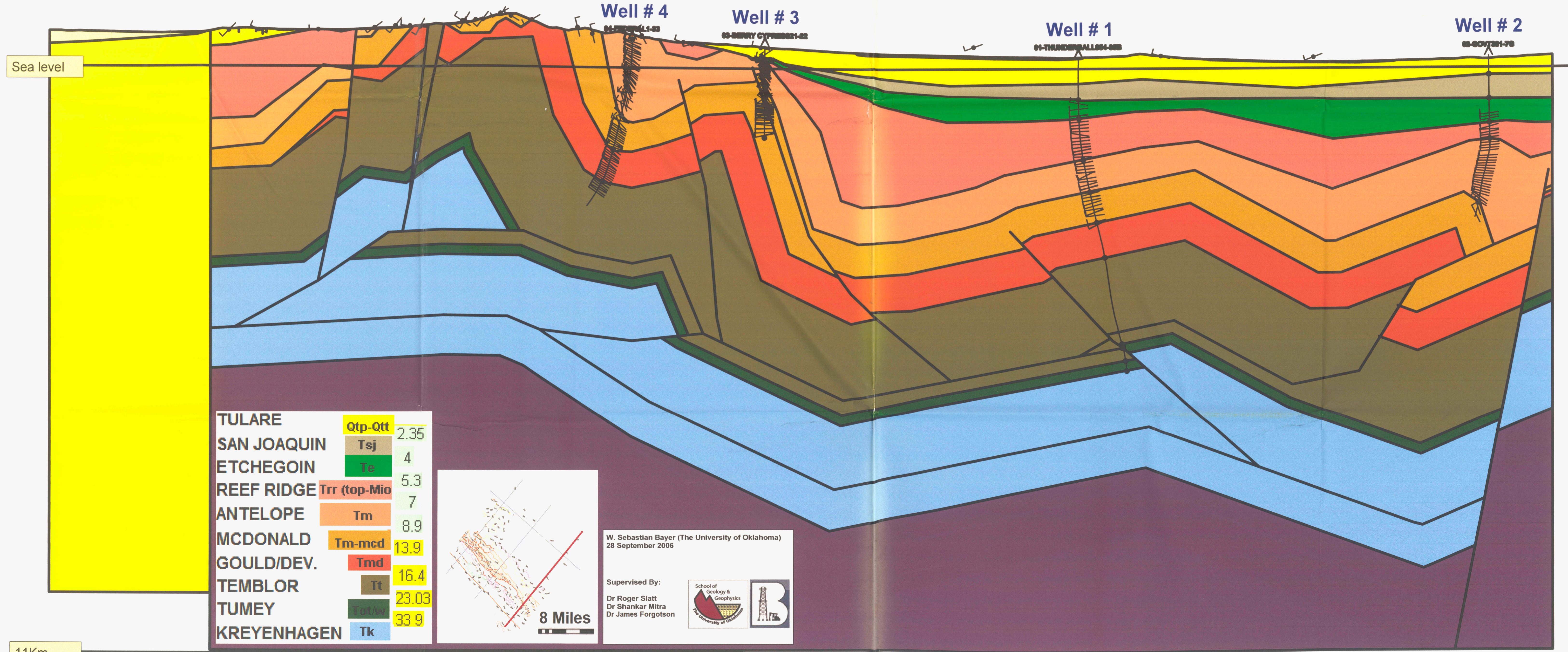
SW

Structural Cross-section A-A'

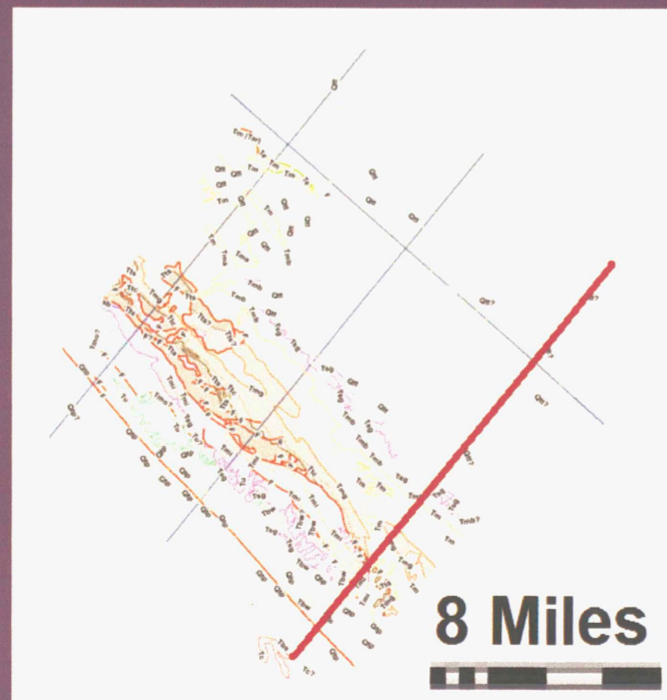
NE

Midway-Sunset Oil Field

Buena Vista Oil Field

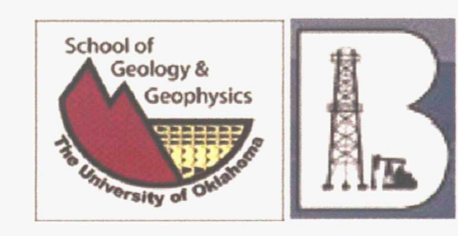


TULARE	Qtp-Qtt	2.35
SAN JOAQUIN	Tsj	4
ETCHEGOIN	Te	5.3
REEF RIDGE	Trr (top-Mio)	7
ANTELOPE	Tm	8.9
MCDONALD	Tm-mcd	13.9
GOULD/DEV.	Tmd	16.4
TEMBLOR	Tt	23.03
TUMEY	Ttd	33.9
KREYENHAGEN	Tk	



W. Sebastian Bayer (The University of Oklahoma)
28 September 2006

Supervised By:
Dr Roger Slatt
Dr Shankar Mitra
Dr James Forgotson

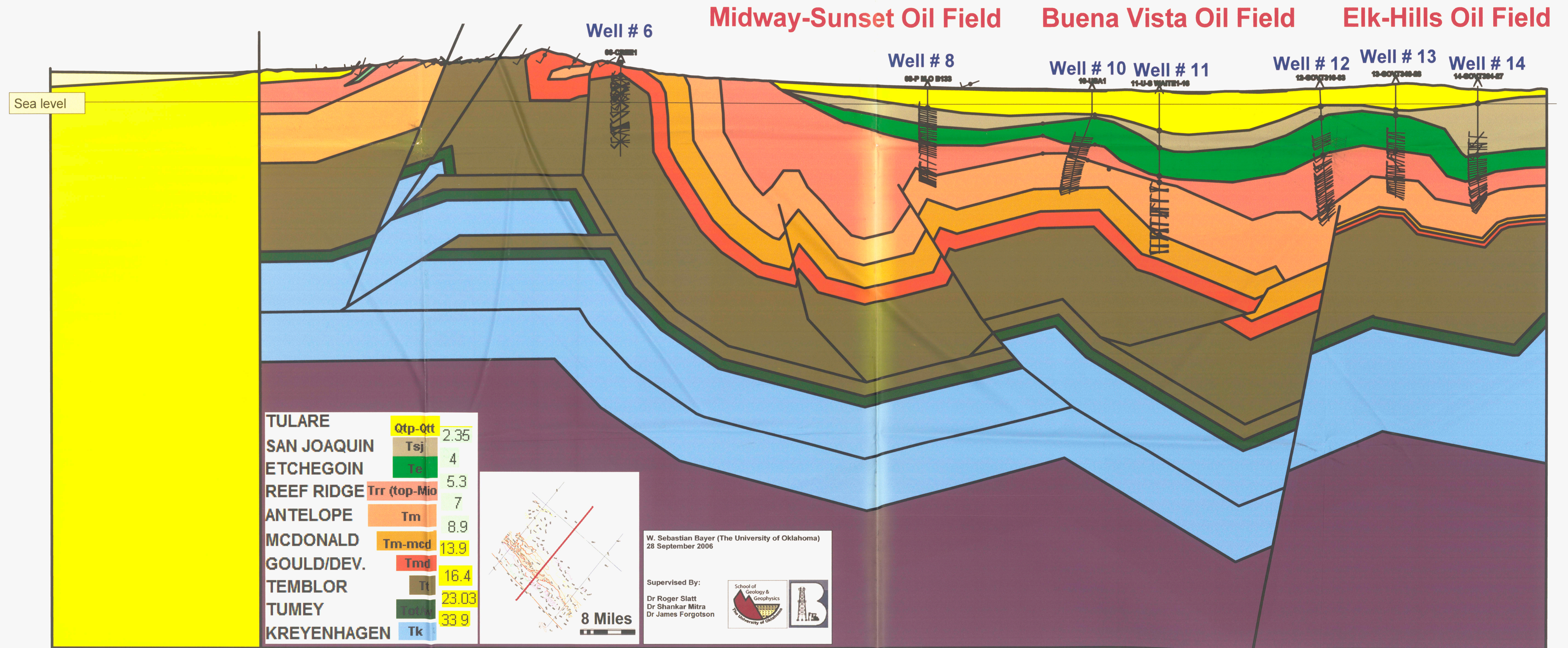


29.4 Km (18.3 miles Aprox.)

SW

Structural Cross-section B-B'

NE



11Km.

29.4 Km (18.3 miles Aprox.)

SW

Structural Cross-section C-C'

NE

Southern Belgian Anticline

Elk-Hills Oil Field

North Midway-Sunset

Well # 6

Well # 21

Well # 20

Well # 18

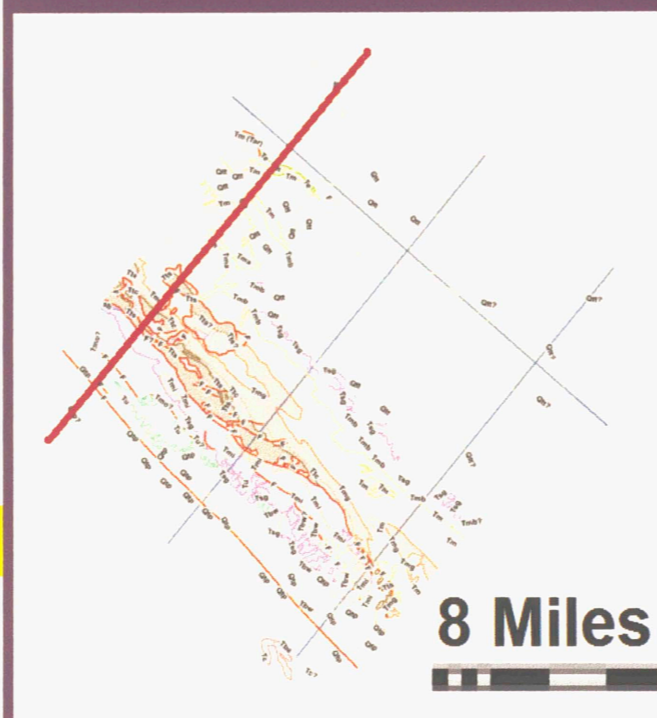
Well # 17

Well # 16

Well # 15

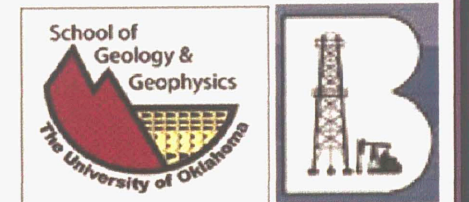
Sea level

TULARE	Qtp-Qtt	2.35
SAN JOAQUIN	Tsj	4
ETCHEGOIN	Te	5.3
REEF RIDGE	Trr (top-Mio)	7
ANTELOPE	Tm	8.9
MCDONALD	Tm-mcd	13.9
GOULD/DEV.	Tmd	16.4
TEMBLOR	Tt	23.03
TUMEY	Tol/w	33.9
KREYENHAGEN	Tk	



W. Sebastian Bayer (The University of Oklahoma)
28 September 2006

Supervised By:
Dr Roger Slatt
Dr Shankar Mitra
Dr James Forgotson



11Km.

29.4 Km (18.3 miles Aprox.)

APPENDIX 13

Detailed Structural Cross Sections

SW

Detail Structural Cross-sections

NE

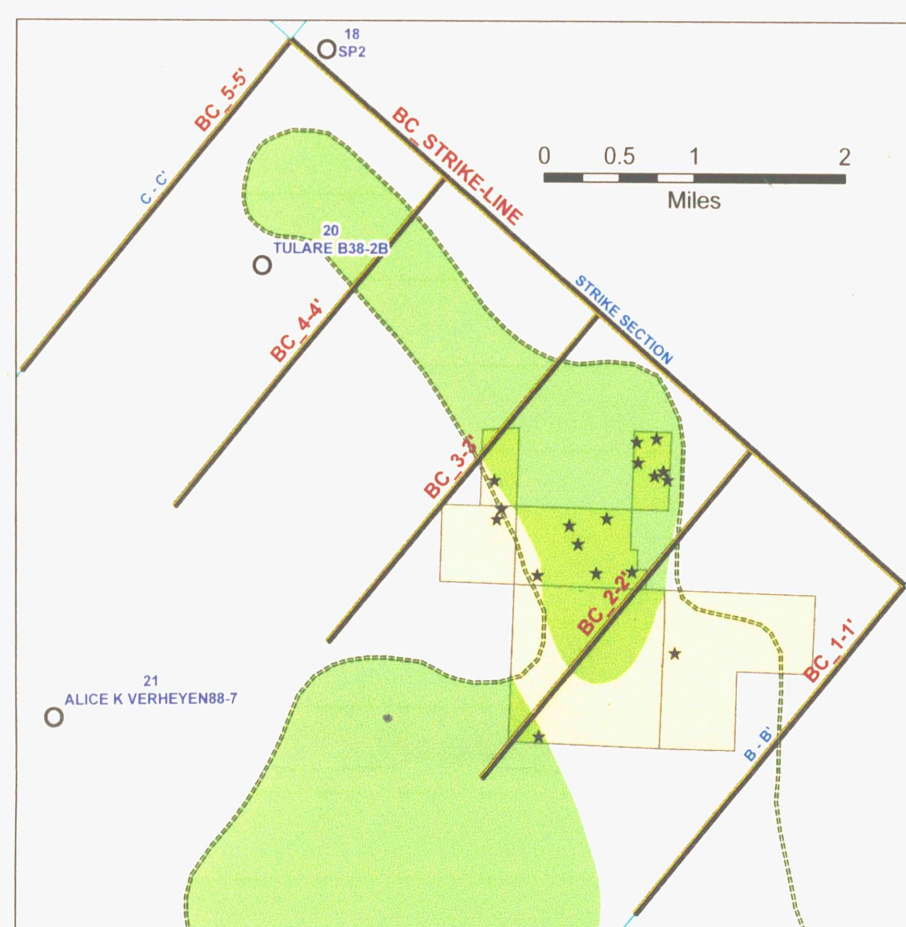
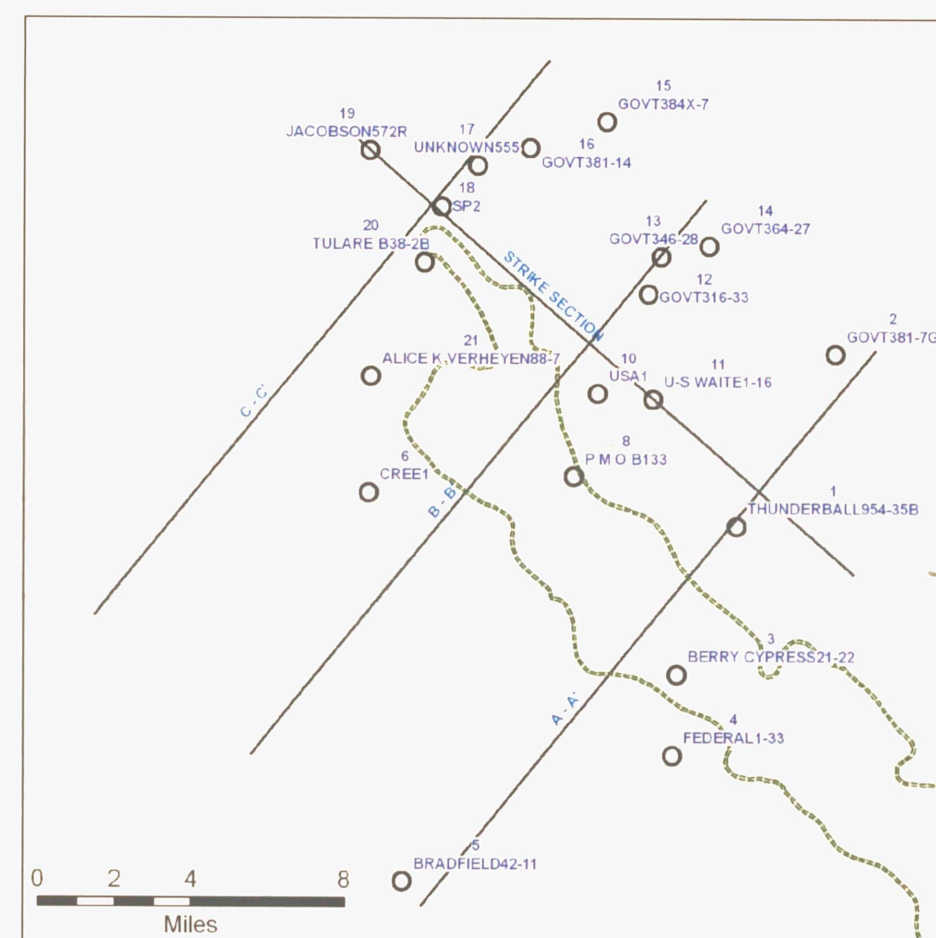
BC_5-5'

BC_4-4'

BC_3-3'

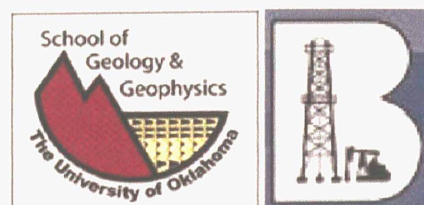
BC_2-2'

BC_1-1'

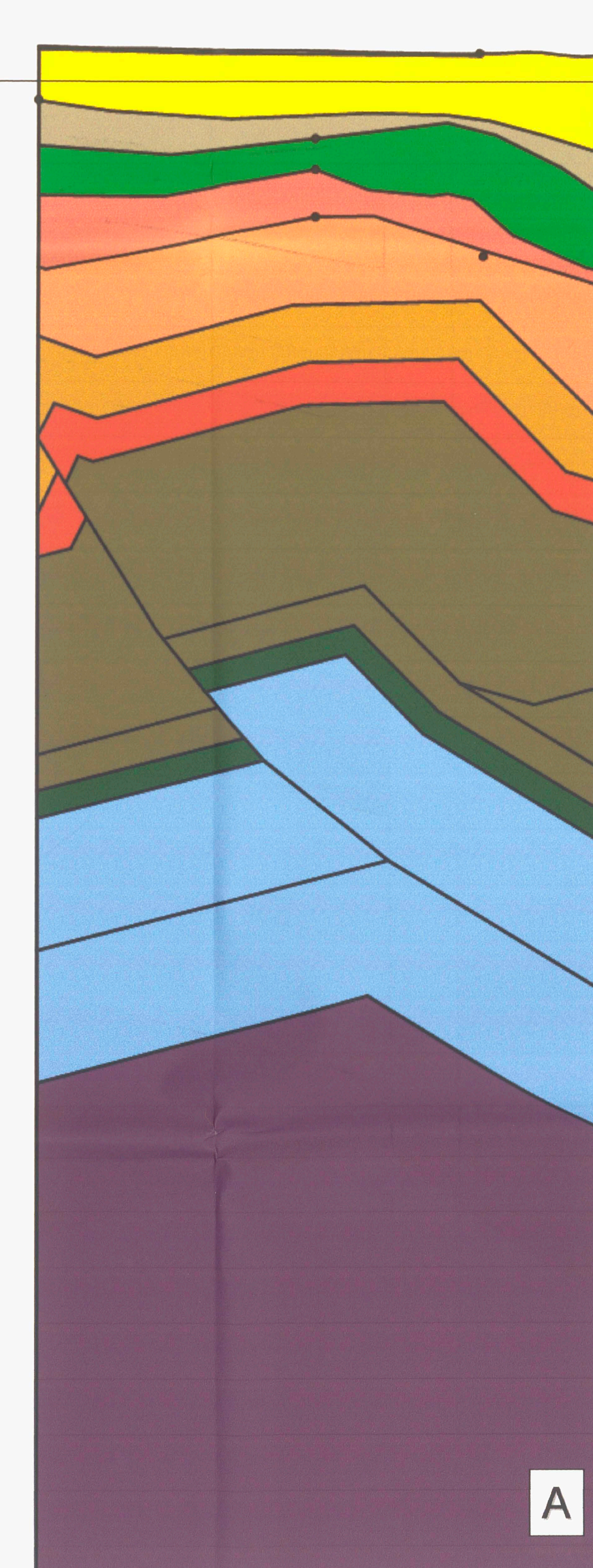
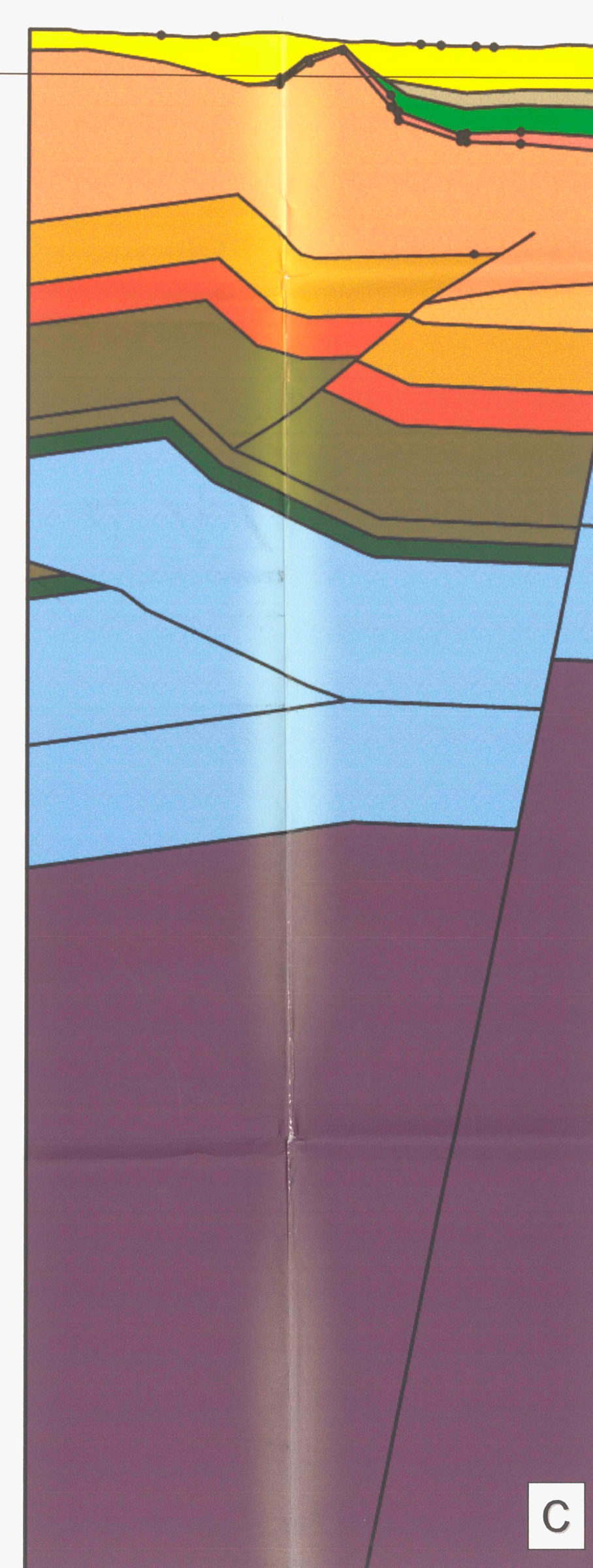
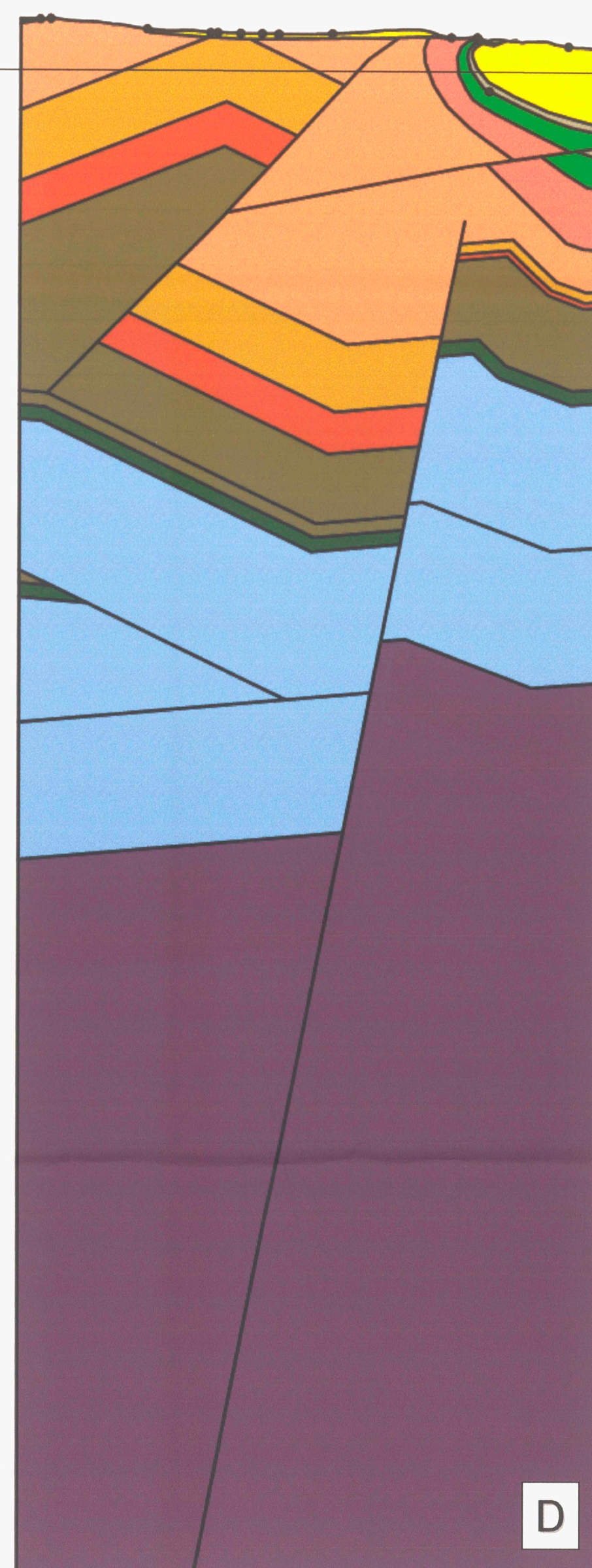
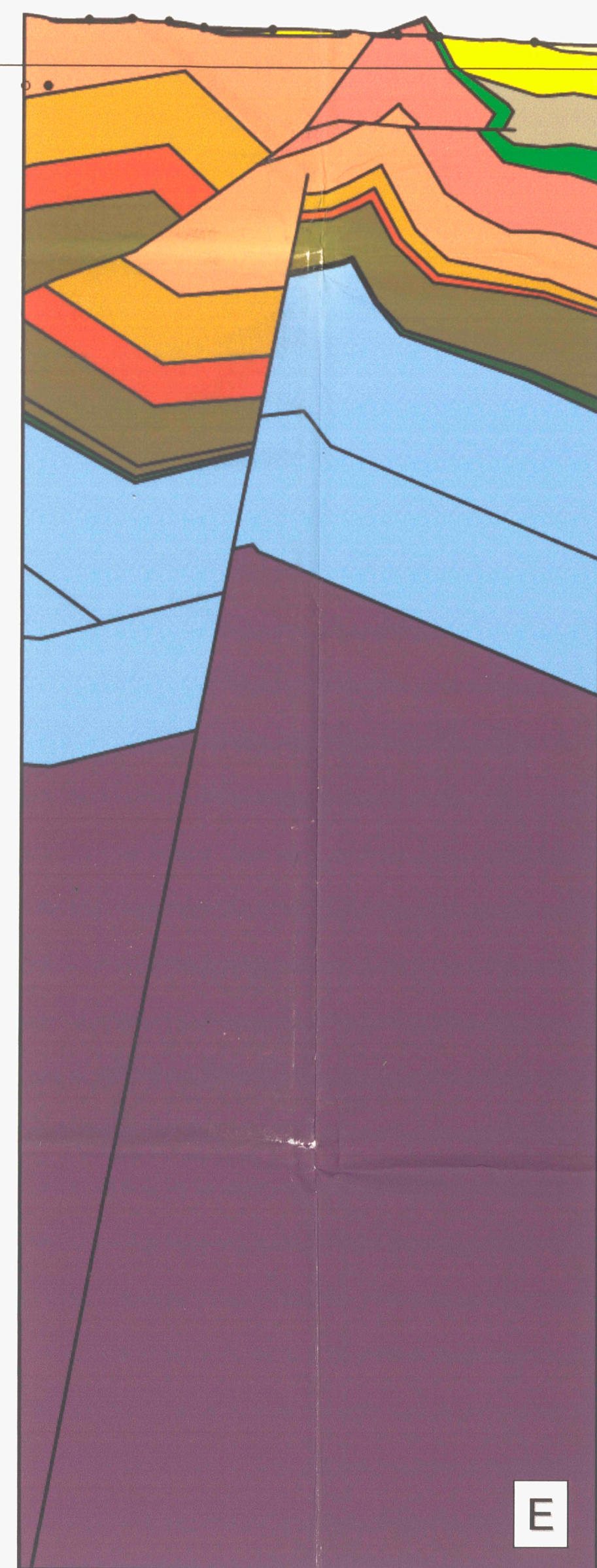


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Sea level



Sea level

Black dots
indicate
control points

11Km.

11Km.

4.471 Km