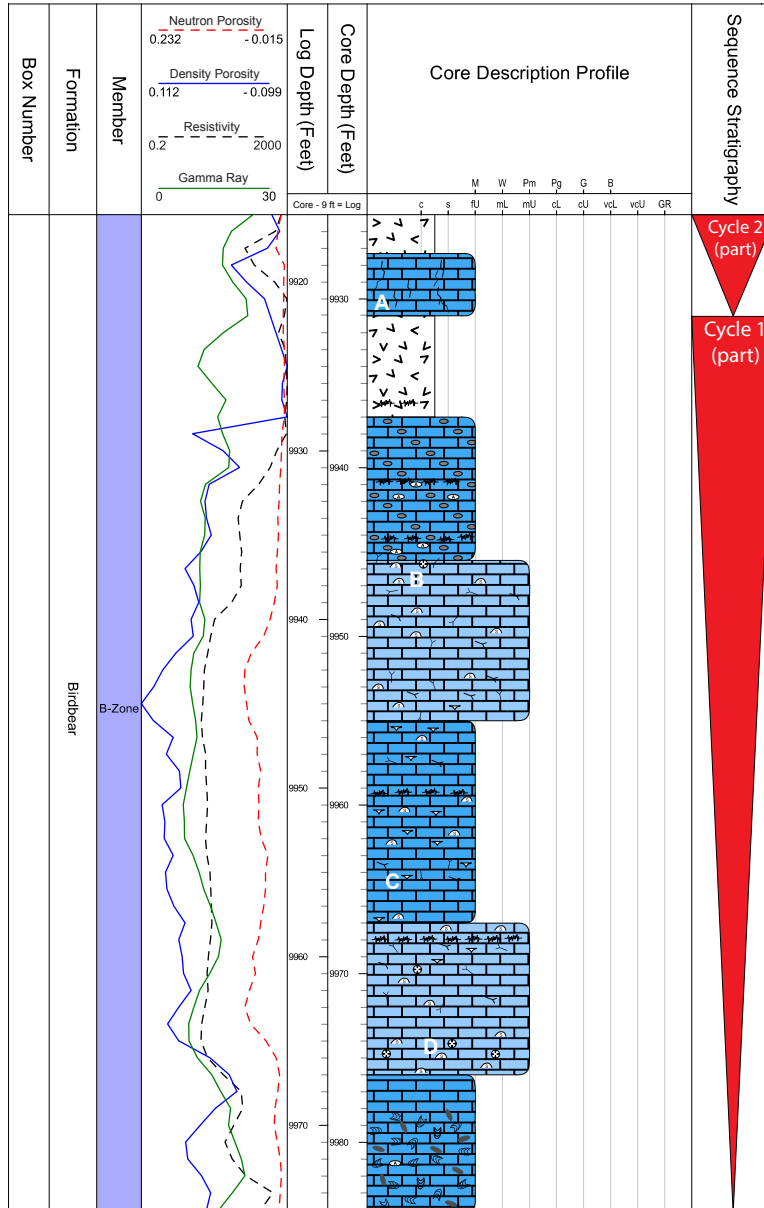


Birdbear Formation (Late Devonian) of North Dakota

A Core Atlas

Jeffrey W. Bader



GEOLOGIC INVESTIGATION NO. 226
 NORTH DAKOTA GEOLOGICAL SURVEY
 Edward C. Murphy, State Geologist
 Lynn D. Helms, Director Dept. of Mineral Resources
 2019



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This document presents detailed lithologic descriptions from 16 select Birdbear Formation rock cores across the state of North Dakota (Fig. 1). Cores were viewed and described at the Wilson M. Laird Core Library from February to August 2019, and during August 2018. Core profiles including: 1) Well information; 2) log responses for gamma-ray, resistivity, neutron porosity, and density porosity; 3) detailed lithology graphic with generalized description; 4) sequence stratigraphic graphic showing interpreted shallowing-upwards cycles; and 5) core photographs, are presented. Printing on 11x17 is recommended for optimal graphics.

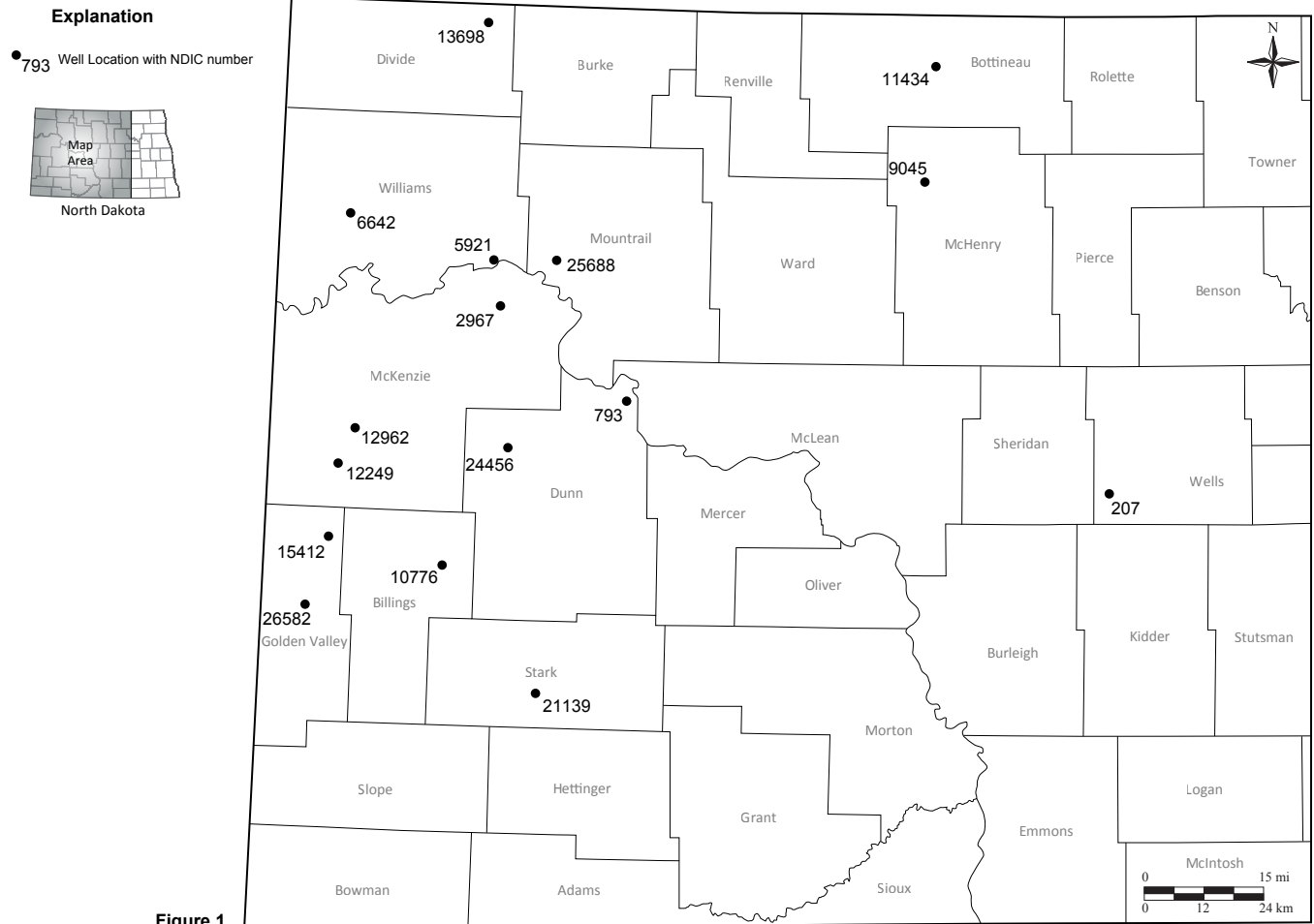




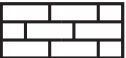

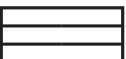

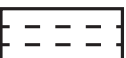

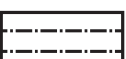

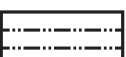






















Figure 1.

Legend

	Anhydrite		Cemented Fracture
	Dolostone		Coral
	Limestone		Cross Laminated
	Shale		Dolomitic
	Claystone		Fossil
	Mudstone		Gastropod
	Siltstone		Intraclast
	Amphipora		Ostracod
	Anhydritic		Pelloid
	Anhydrite-Bladed		Ripple Lamination
	Anhydrite-Nodular		Rugose Coral
	Brachiopod		Skeletal Material
	Brecciated/Disrupted Bedding		Stromatoporoid
	Burrow		Stylolite
	Carbonaceous		Burrow Mottled
			Undulatory Bedding
			Vuggy Porosity
			Wavy Bedding

DD Duperow Formation

DTF Three Forks Formation

LS Lower Shale (Bakken)

LTF Lower Three Forks

MM Middle Member (Bakken)

UD Upper Devonian



Original Operator

Continental Oil Co.

Top
4195 ft

Bottom
4235 ft

Original Well Name & No.
John Lueth 1

Location
SESE Sec. 27, T146N, R73W

Logged by
Jeffrey W. Bader

Date
Fri Aug 2 2019

Basin
Williston

UWI No.
33-103-00001-00-00

NDIC No.
207

Field
Wildcat

KB
1933 ft

TD
6031 ft

Latitude
47.430491

Longitude
-99.94989

Box Number	Formation	Member	Gamma Ray 0 60	Core Depth (F-feet) Log Depth (F-feet)	Core Description Profile	Sequence Stratigraphy	Notes	Core Photographs
		MM		Core + 85 ft = Log			Limestone, yellowish gray	
	Bakken	LS		4200			Shale, brownish black	
	Birdbeer	B-Zone ?		4290 4210 4300 4220 4310 4230	A B C		Dolostone (caliche/calcrete), pale pink to pale reddish purple, significant vuggy porosity, birdseye structure	
DD					C		Shale, dusky red to greenish gray	



Original Operator
Mobil Producing Company





Top
 10308.8 ft
 Original Well Name & No.
Pegasus Div Soloman Birdbear #F 22-22-1
 Logged by
Jeffrey W. Bader

Basin
Williston
 NDIC No.
793
 KB
2102 ft
 Latitude
47.71211

Bottom
 10391.7 ft
 Location
SENW Sec. 22, T149N, R91W
 Date
Thu Mar 14 2019

UWI No.
33-033-025-00005-00-00
 Field
Wildcat

TD
13481 ft
 Longitude
-102.313085

Box Number	Formation	Member	Gamma Ray	Log Depth (Feet)	Core Depth (Feet)	Core Description Profile	Sequence Stratigraphy	Notes	Core Photographs
	DTF	LTF	0 60						
		A-Zone							
		Birdbear							
		B-Zone							
				10310	10310		Cycle 4	Anhydrite, medium bluish gray, bedded to nodular	
				10320	10320		Cycle 3	Dolostone, pale yellowish brown to pinkish gray, laminated to ripple cross laminated Anhydrite, pinkish gray to medium dark gray, nodular to bladed Limestone (mudstone), olive gray, laminated to thin-bedded, hairline anhydrite-filled fractures, becomes dolostone from 10,318.6 to 10,318.9 ft. and from 10,321.0 to 10,32.7 ft., dolostone is thin-bedded to massive.	
				10330	10330		Cycle 2	Anhydrite, medium bluish gray, bedded, thin dolostone interbeds Dolostone, very pale orange, massive Limestone, brownish black, dolomitic	
				10340	10340		Cycle 1 (part)	Anhydrite, light bluish gray to light olive gray, bedded, thin dolostone interbeds from 10,331.6 ft. Limestone (mudstone to packstone), dusky yellowish brown, laminated to massive, fossiliferous (amphipora, stromatoporoids, coral)	
				10350	10350				
				10360	10360				
				10370	10370				
				10380	10380				
				10390	10390				



Original Operator

Texaco Inc.

Top
10536.7 ft

Original Well Name & No.
A.S. Wisness #2

Logged by
Jeffrey W. Bader

Basin
Williston

NDIC No.
2967

KB
2317 ft

Latitude
48.012382

Bottom
10590.8 ft

Location
NWSE Sec. 3, T152N, R96W

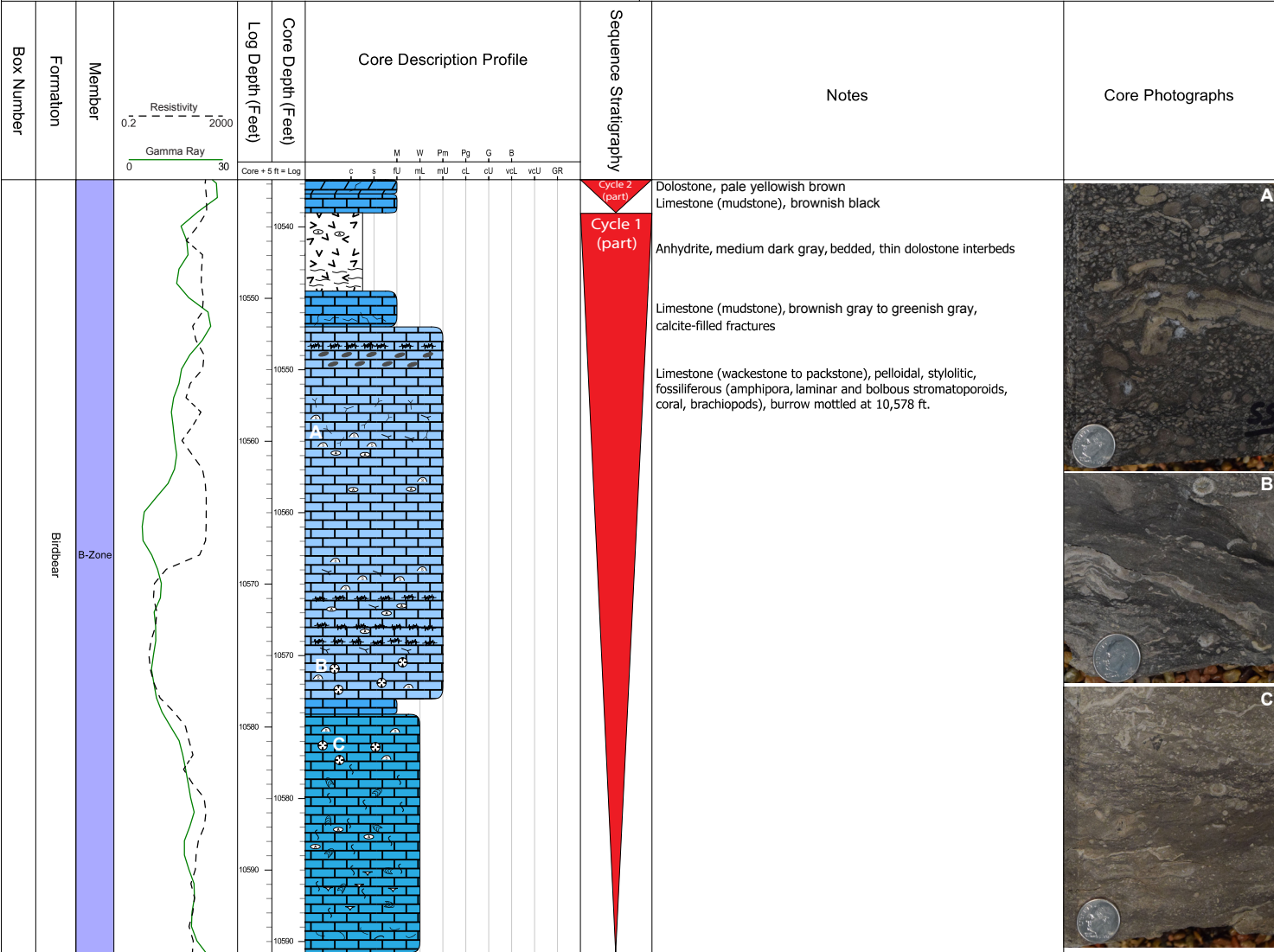
Date
Thu Apr 18 2019

UWI No.
33-053-00493-00-00

Field
Keene

TD
11092 ft

Longitude
-102.948411





Original Operator
Ashland Oil, Inc.

Top
9925 ft
 Original Well Name & No.
Anna Mendenhall 1-18

Logged by
Jeffrey W. Bader

Basin
Williston
 NDIC No.
5921

KB
1885 ft

Latitude
48.155641

Bottom
9984.2 ft

Location
SESE Sec. 18, T154N, R95W

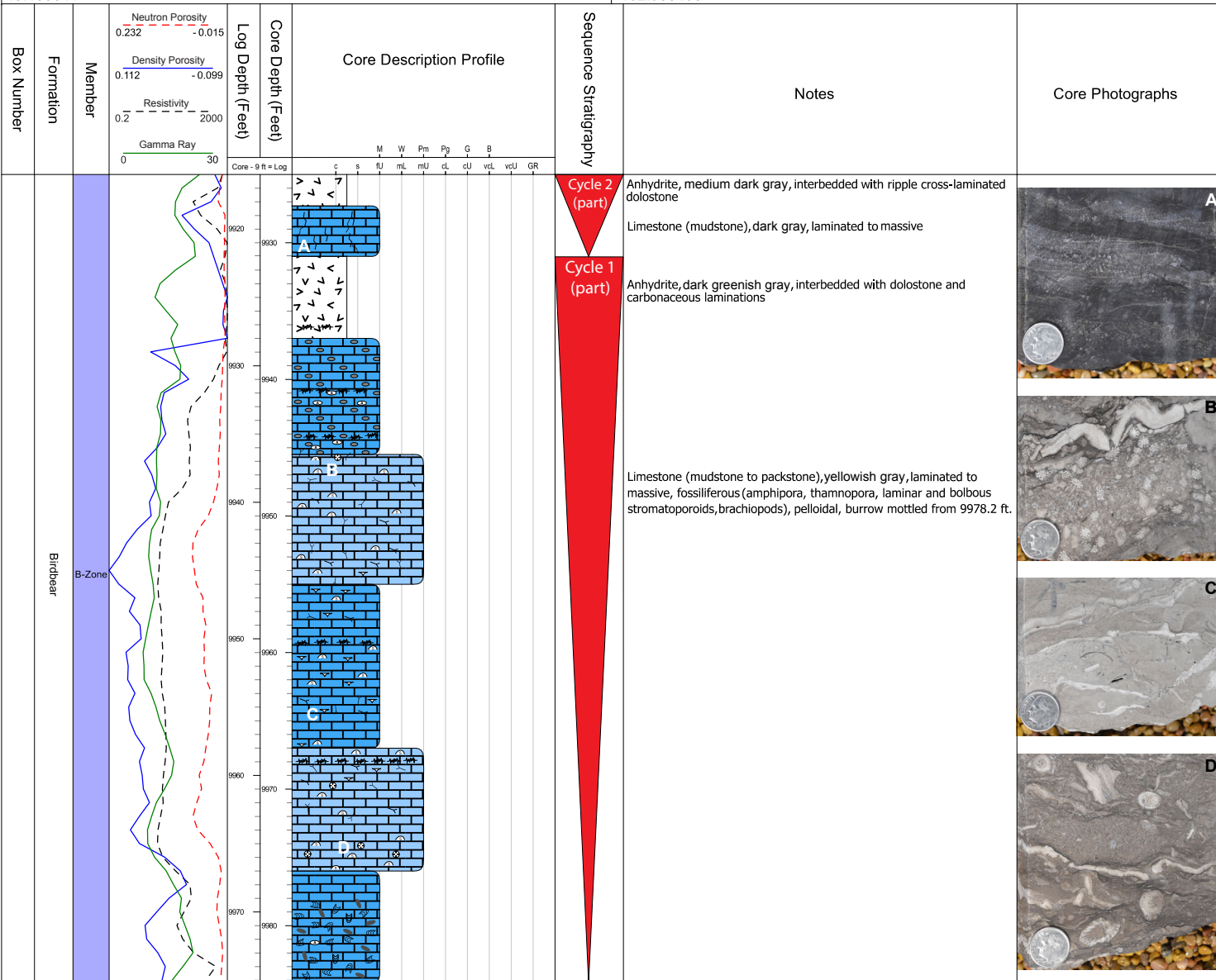
Date
Sat Mar 2 2019

UWI No.
33-105-00744-00-00

Field
Grinnell

TD
10600 ft

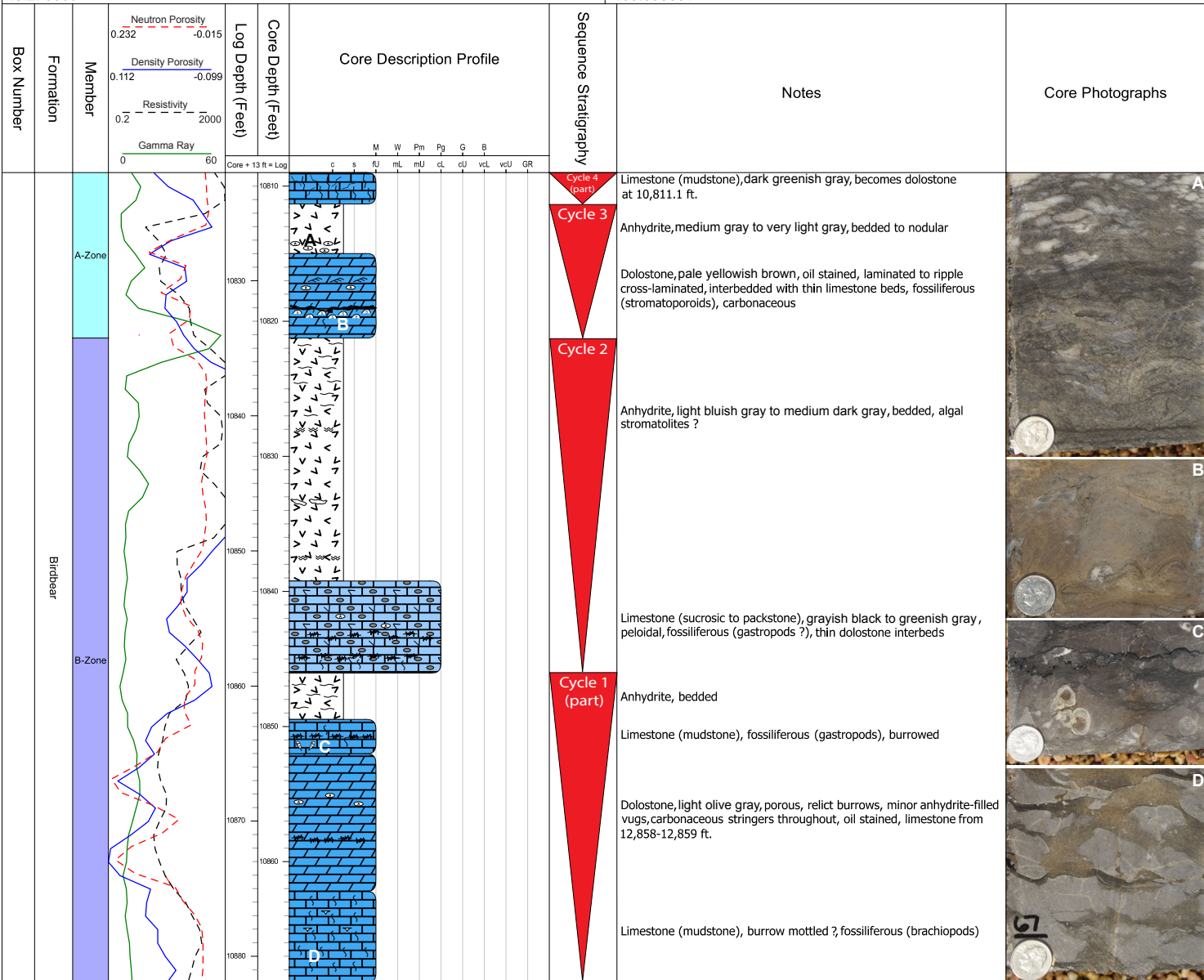
Longitude
-102.938406





Original Operator
Tenneco Oil Company

Top 10809 ft	Bottom 10869 ft
Original Well Name & No. W.C. Jensen et al #1-5	Location NESE Sec. 5, T55N, R101W
Logged by Jeffrey W. Bader	Date Wed Feb 27 2019
Basin Williston	UWI No. 33-105-00774-00-00
NDIC No. 6642	Field Missouri Ridge
KB 2229 ft	TD 13536 ft
Latitude 48.276009	Longitude -103.693631





Original Operator Energy Reserves Group Inc.	
Top 5055.3 ft	Bottom 5091 ft
Original Well Name & No. Big Sky et al #1	Location NWSE Sec. 4, T157N, R79W
Logged by Jeffrey W. Bader	Date Mon Mar 11 2019
Basin Williston	UWI No. 33-049-00128-00-00
NDIC No. 9045	Field Wildcat
KB 1480 ft	TD 5550 ft
Latitude 48.449981	Longitude -100.872124

Box Number	Formation	Member	Log Depth (Feet)	Core Depth (Feet)	Core Description Profile	Sequence Stratigraphy	Notes	Core Photographs
		A-Zone				<p>Cycle 3 (part)</p> <p>Cycle 2</p> <p>Cycle 1 (part)</p>	<p>Limestone (mudstone to wackestone), very pale orange to pale yellowish brown, ripple-laminated to cross bedded, anhydrite-filled fractures, dolomitic mudstone from 5055.3 to 5055.8 ft.</p> <p>Anhydrite, greenish gray to medium bluish gray, thin dolostone interbeds</p> <p>Limestone (mudstone), very pale orange, dolomitic, fossiliferous (amphipora), stylolitic</p> <p>Dolostone, dark yellowish brown, fossiliferous (amphipora, tabular stromatoporoids, coral), vuggy porosity, some anhydrite-filled cavities</p> <p>Limestone (packstone), dusky yellow, fossiliferous (amphipora), finer intraparticle and vuggy porosity, stylolitic</p> <p>Limestone (wackestone to packstone), grayish yellow, fossiliferous (amphipora, solitary rugose coral), interparticle and vuggy porosity with some anhydrite filled, stylolitic</p> <p>Limestone (mudstone), pinkish gray, dolomitic, sucrosic, trace vuggy porosity and coral</p>	



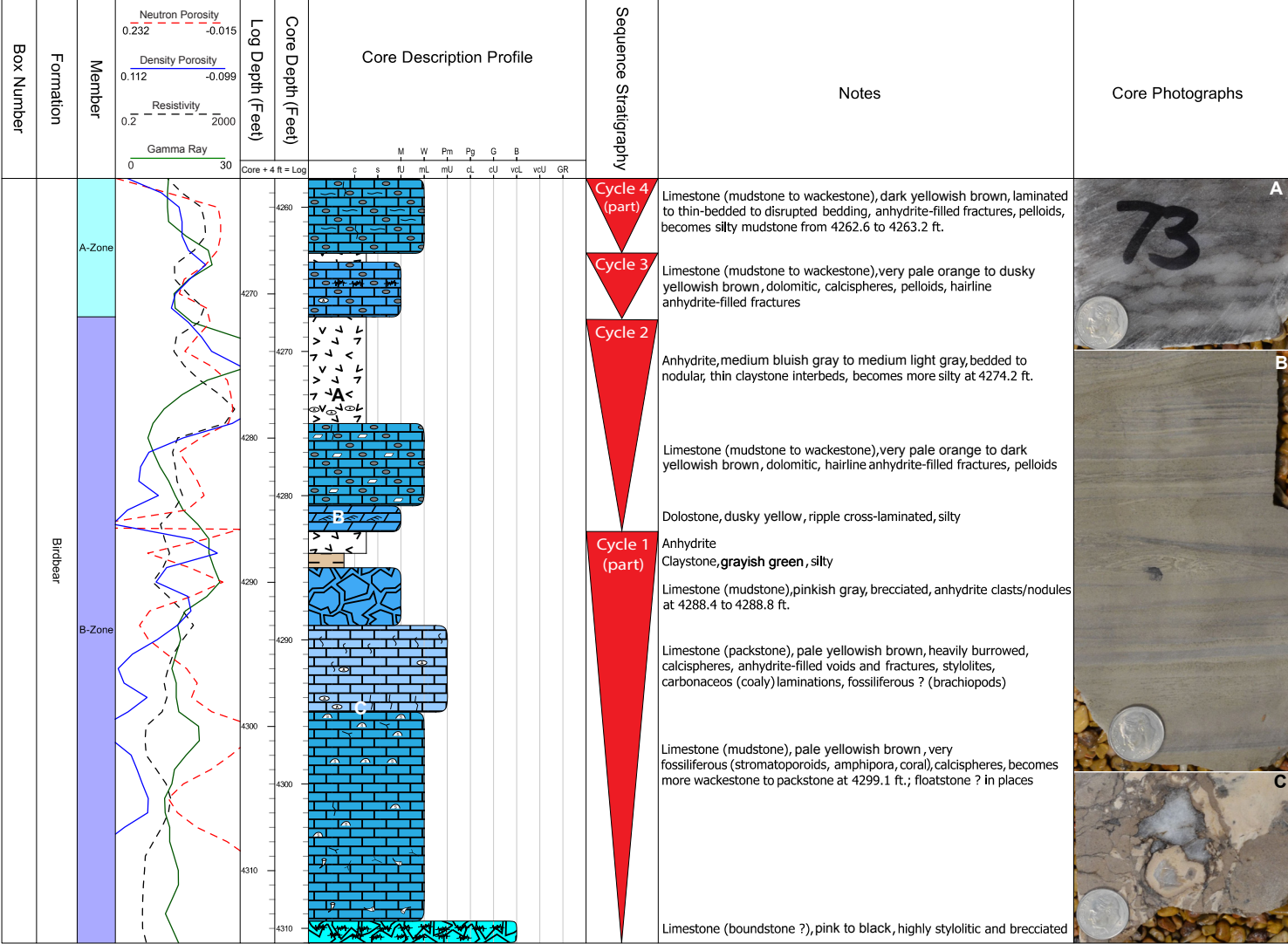
Original Operator Propel Energy Co.	
Top 11196 ft	Bottom 11226.7 ft
Original Well Name & No. Anna Logosz 1	Location NESW Sec. 24, T142N, R99W
Logged by Jeffrey W. Bader	Date Mon Jul 29 2019
Basin Williston	UWI No. 33-007-00994-00-00
NDIC No. 10776	Field Wildcat
KB 2669 ft	TD 11636 ft
Latitude 47.101543	Longitude -103.172644

Box Number	Formation	Member	Neutron Porosity Density Porosity Resistivity Gamma Ray Log Depth (F eet) Core Depth (F eet)	Core Description Profile	Sequence Stratigraphy	Notes	Core Photographs
	Birdbear	B-Zone			Cycle 1 (part)	Anhydrite, dark greenish gray, bedded, interbedded with grayish claystone Limestone (mudstone), dark gray, massive Dolostone Limestone (packstone) Limestone (packstone to bindstone), fossiliferous (laminar and bulbous stromatoporoids, amphipora, coral) Limestone (mudstone), burrow mottled, fossiliferous (brachiopods)	



Original Operator
Citation Oil and Gas Corporation

Top 4258 ft	Bottom 4311 ft
Original Well Name & No. Ardis Holen #21-30	Location NENW Sec. 30, T162N, R78W
Logged by Jeffrey W. Bader	Date Mon Mar 4 2019
Basin Williston	UWI No. 33-009-01723-00-00
NDIC No. 11434	Field Wildcat
KB 1493 ft	TD 4500 ft
Latitude 48.833574	Longitude -100.831976





Original Operator
Meridian Oil, Inc.

Top
10964 ft
Original Well Name & No.
MOI # 21-17

Logged by
Jeffrey W. Bader

Basin
Williston

NDIC No.
12249

KB
2360 ft

Latitude
47.472273

Bottom
11024 ft

Location
NENW Sec. 17, T146N, R102W

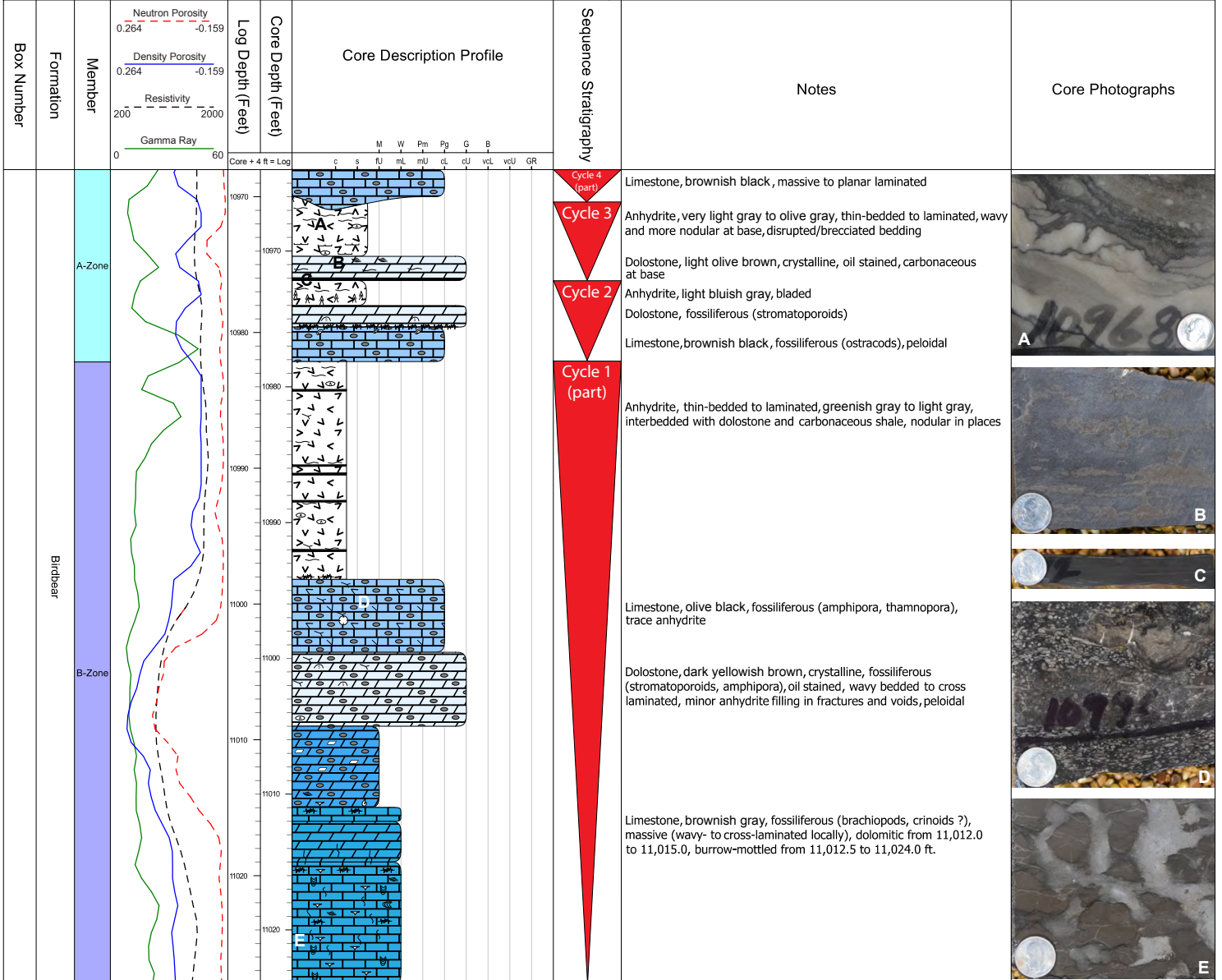
Date
Tue Aug 14 2018

UWI No.
33-053-02208-00-00

Field
Pierre Creek

TD
13323 ft

Longitude
-103.707705





Original Operator

Penzoil Exploration and Production Company

Top
10962 ft

Bottom
11022 ft

Original Well Name & No.
North Branch 35X-34BN

Location
SWSE Sec. 35, T148N, R102W

Logged by
Jeffrey W. Bader

Date
Fri Aug 31 2018

Basin
Williston

UWI No.
33-053-02336-00-00

NDIC No.
12962

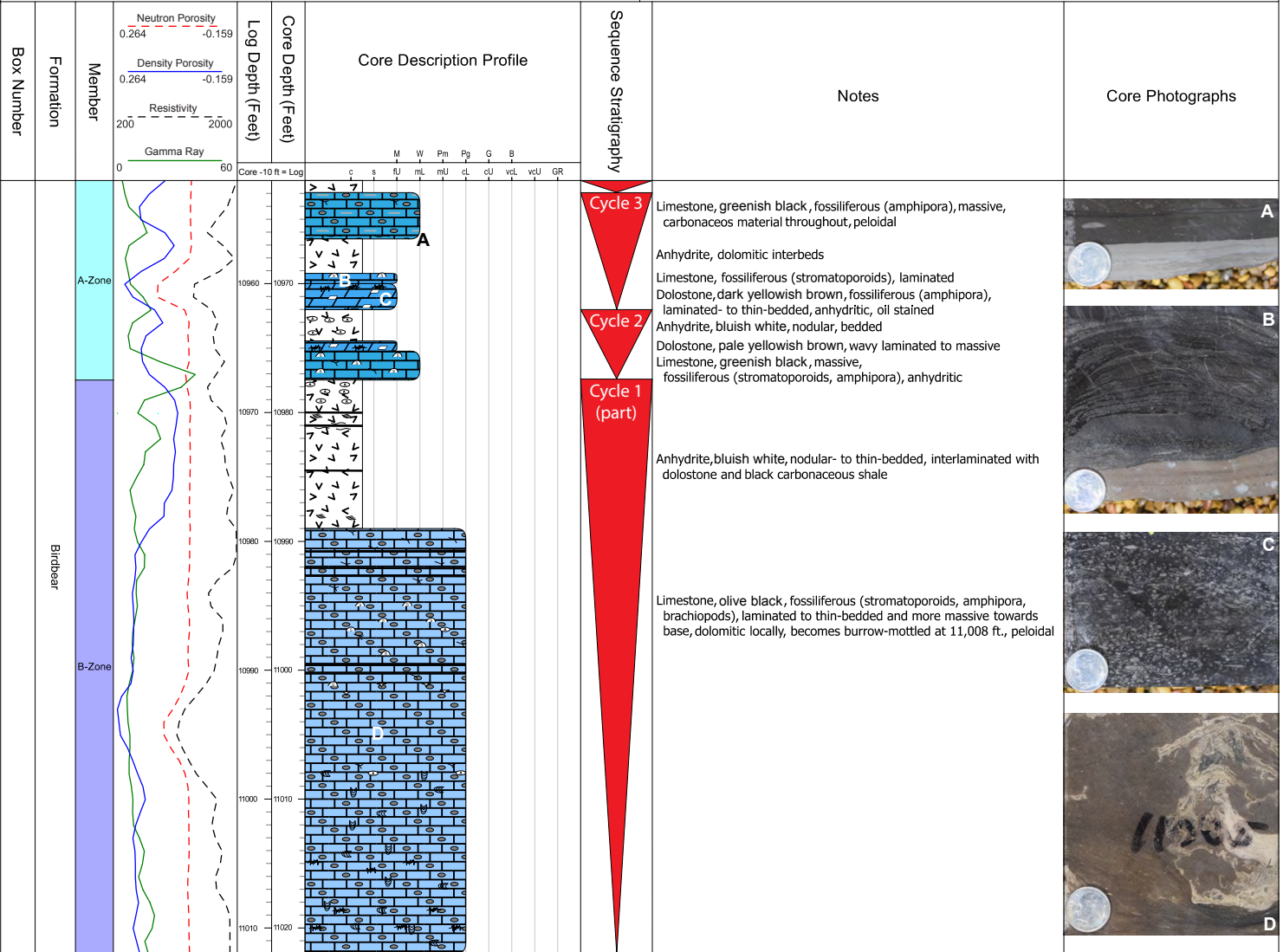
Field
North Branch

KB
2227 ft

TD
13465 ft

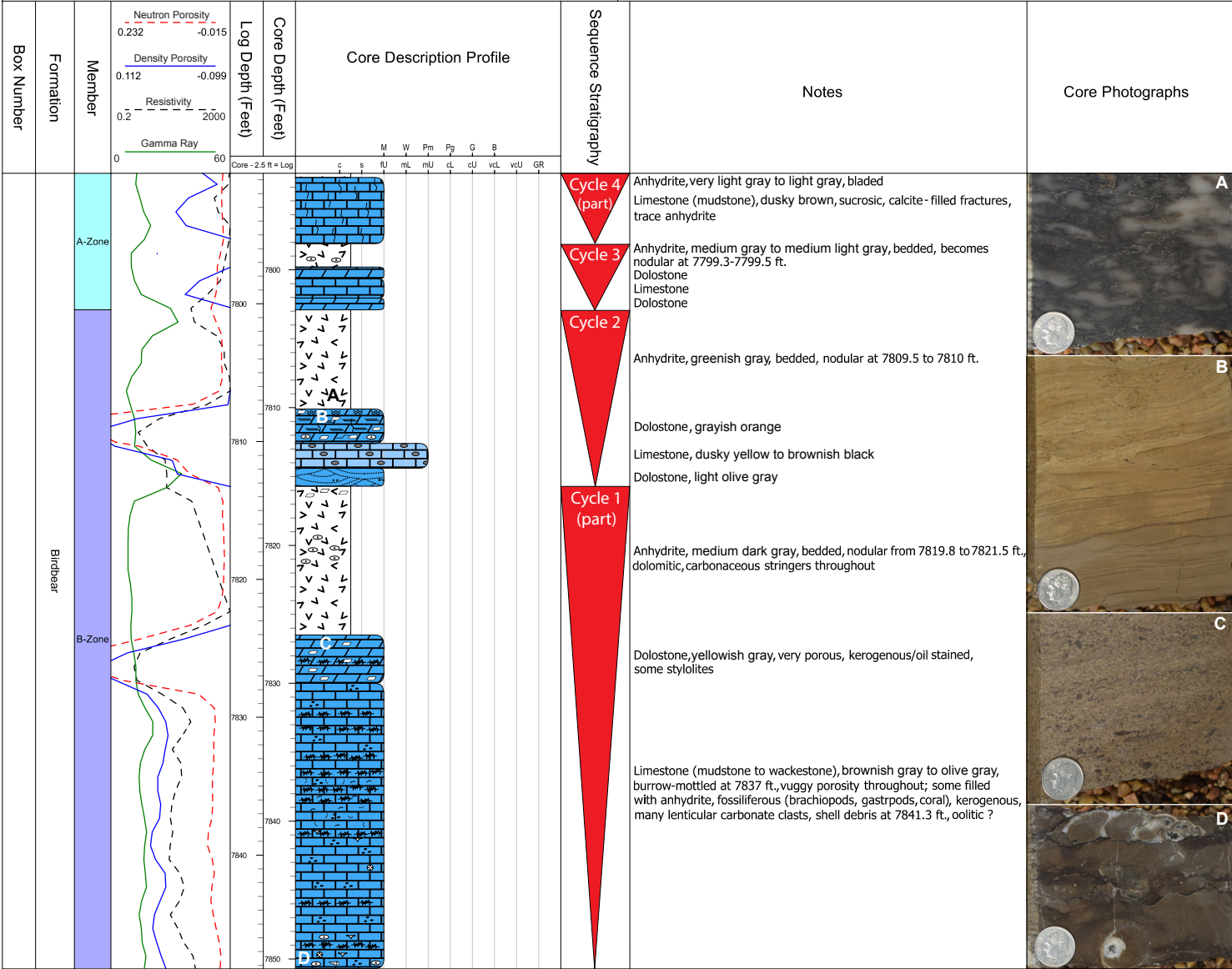
Latitude
47.592901

Longitude
-103.635141





Original Operator RJL Oil and Gas, Inc.	
Top 7793 ft	Bottom 7850.7 ft
Original Well Name & No. RJL Dudley Kimberly #14-18	Location SESW Sec. 18, T163N, R95W
Logged by Jeffrey W. Bader	Date Mon Feb 11 2019
Basin Williston	UWI No. 33-023-00425-00-00
NDIC No. 13698	Field Kimberly
KB 1920 ft	TD 7950 ft
Latitude 48.939582	Longitude -103.061891

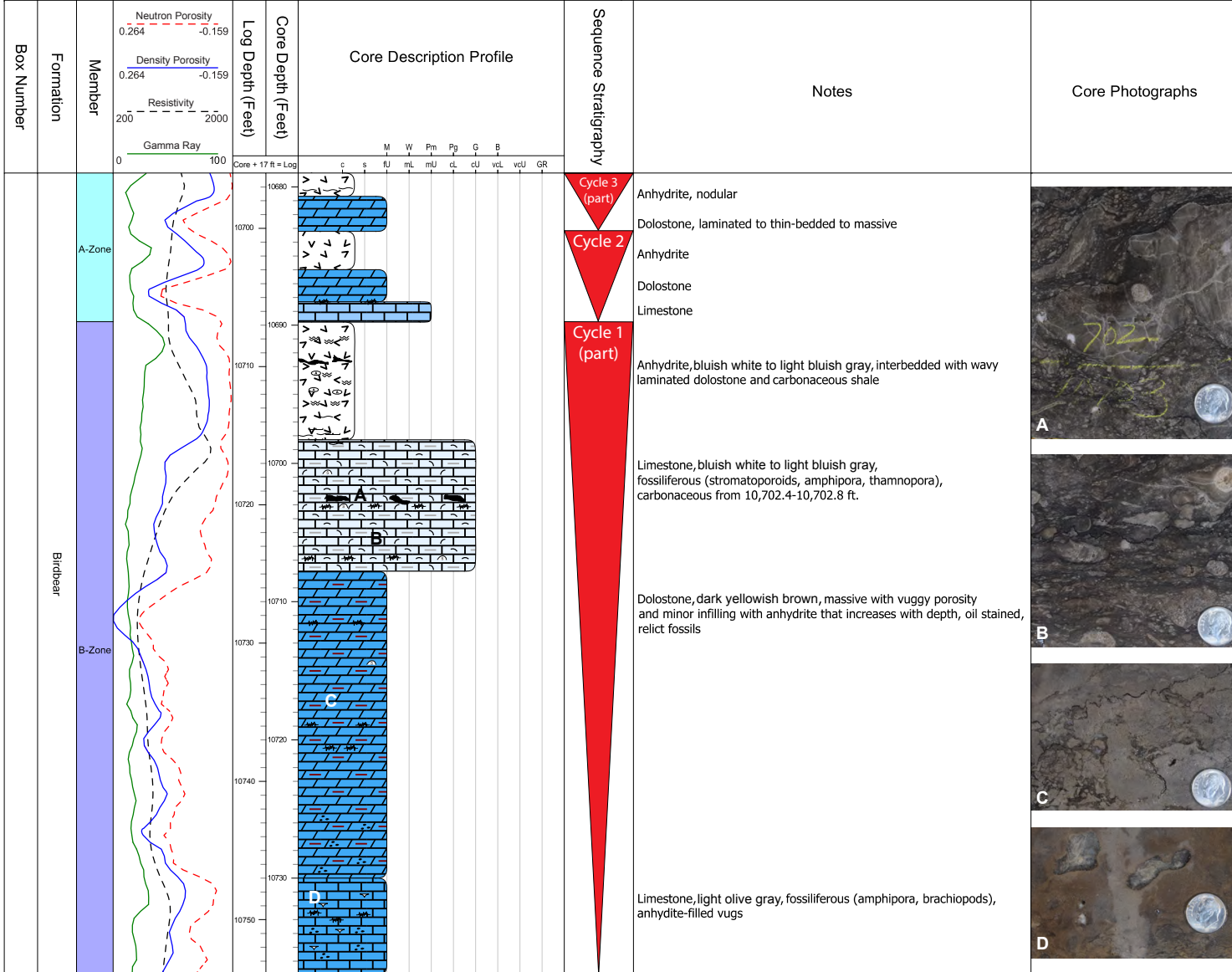




Original Operator
Equity Oil Company

Top
10679 ft
 Original Well Name & No.
Federal 32-4
 Logged by
Jeffrey W. Bader
 Basin
Williston
 NDIC No.
15412
 KB
2472 ft
 Latitude
47.234713

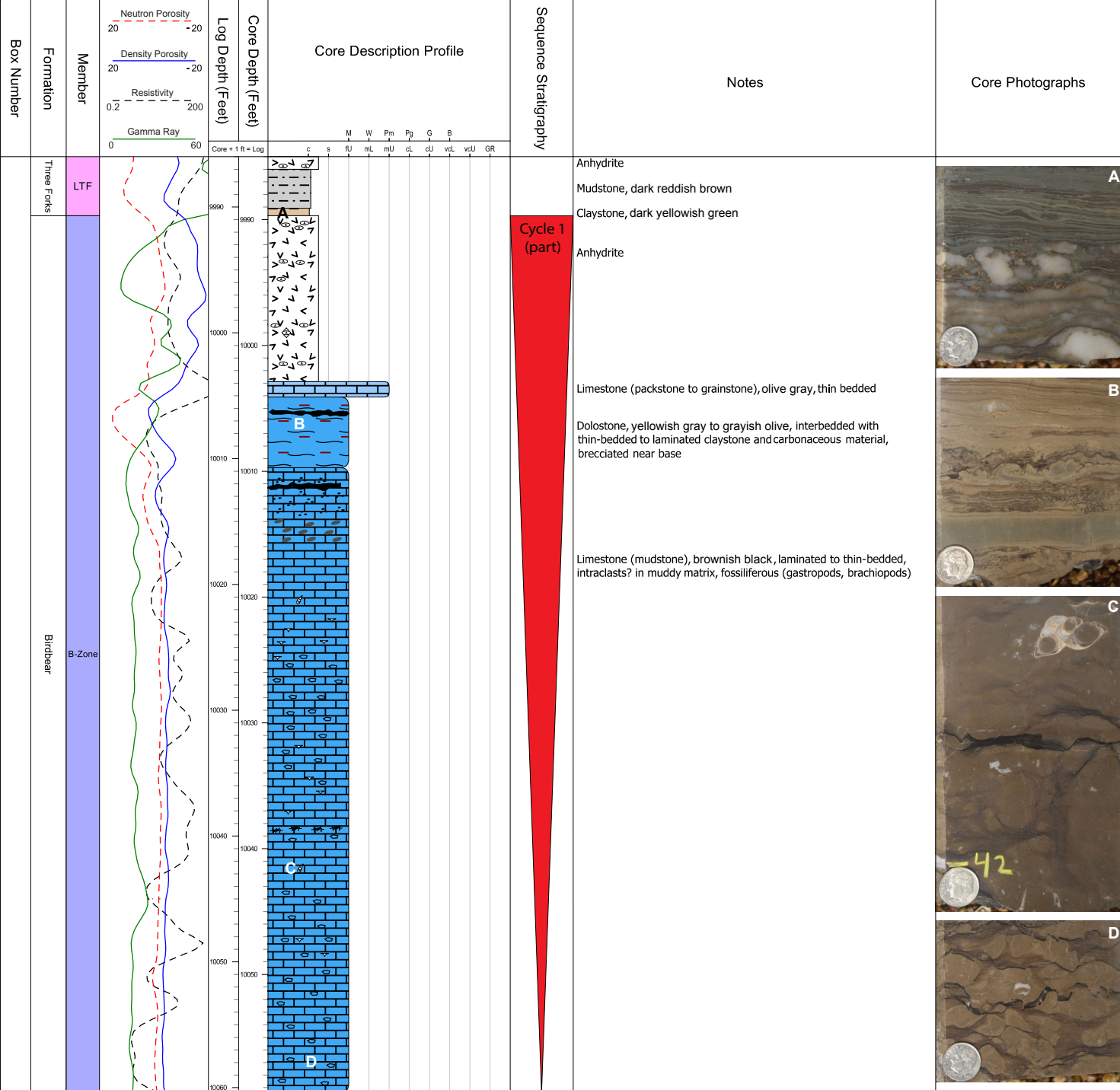
Bottom
10737 ft
 Location
SWNE Sec. 4, T143N, R103W
 Date
Fri Aug 24 2018
 UWI No.
33-033-00239-00-00
 Field
Beaver Creek
 TD
18368 ft
 Longitude
-103.739459





Original Operator
Chesapeake Operating, Inc.

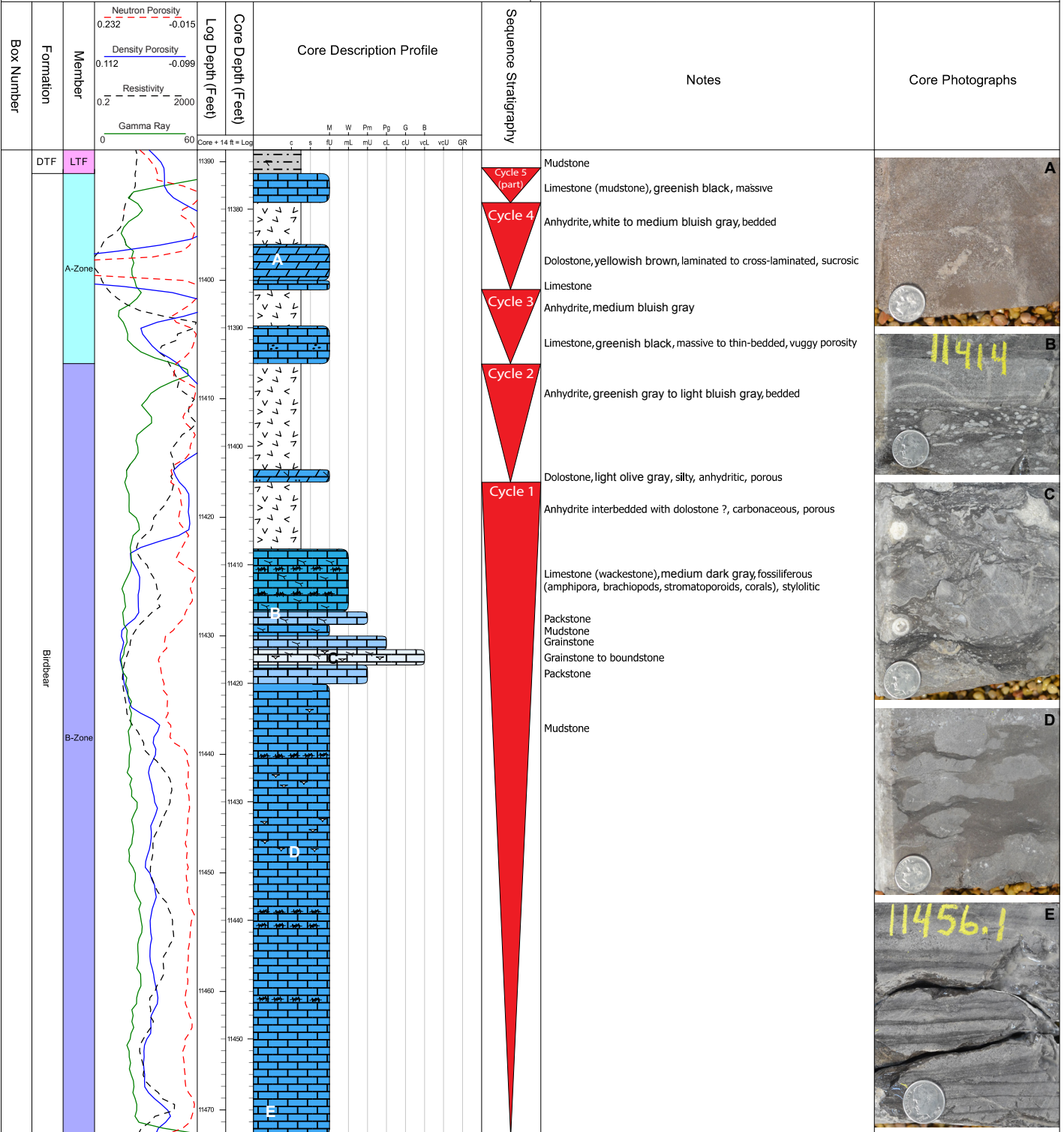
Top 9985 ft	Bottom 10059.4 ft
Original Well Name & No. Zent 30-138-95 A 1H	Location NENE Sec. 30, T138N, R95W
Logged by Jeffrey W. Bader	Date Mon Jul 22 2019
Basin Williston	UWI No. 33-089-00646-00-00
NDIC No. 21139	Field Wildcat
KB 2622 ft	TD 19630 ft
Latitude 46.745044	Longitude -102.711538





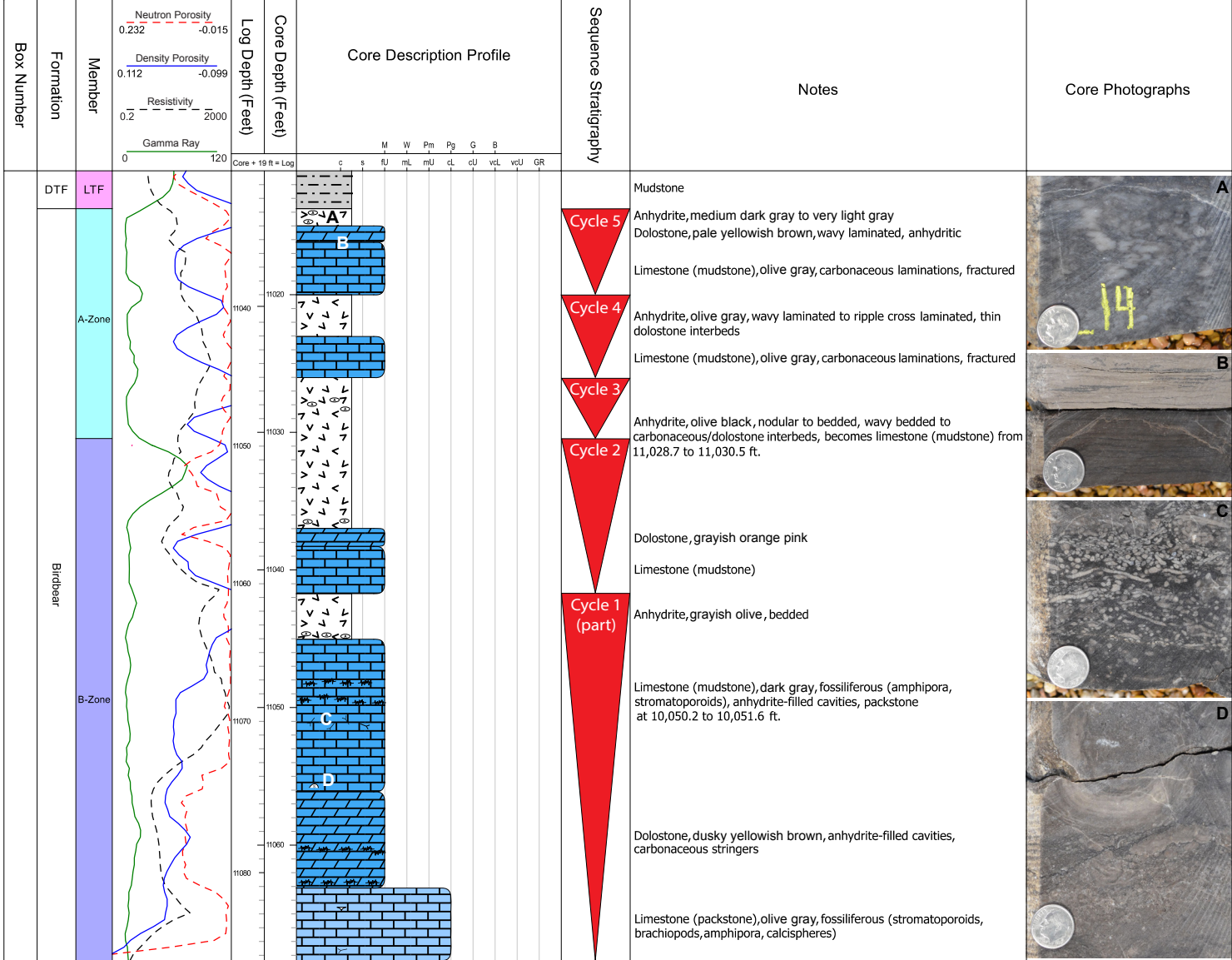
Original Operator
Continental Resources, Inc.

Top 11375 ft	Bottom 11460.5 ft
Original Well Name & No. Hawkinson 14-22H2	Location NENE Sec. 22, T147N, R96W
Logged by Jeffrey W. Bader	Date Thu Apr 4 2019
Basin Williston	UWI No. 33-025-02007-00-00
NDIC No. 24456	Field Oakdale
KB 2514 ft	TD 20838 ft
Latitude 47.544396	Longitude -102.889294





Original Operator Oasis Petroleum North America LLC	
Top 11011 ft	Bottom 11068.4 ft
Original Well Name & No. Mangum 5493 44-7B	Location SESE Sec. 7, T154N, R93W
Logged by Jeffrey W. Bader	Date Tue Apr 2 2019
Basin Williston	UWI No. 33-061-02582-00-00
NDIC No. 25688	Field Robinson Lake
KB 2350 ft	TD 20800 ft
Latitude 48.168577	Longitude -102.681297





Original Operator
Whiting Oil and Gas Corporation

Top 10588 ft	Bottom 10661.5 ft
Original Well Name & No. Maus 21-26	Location NENW Sec. 26, T141N, R104W
Logged by Jeffrey W. Bader	Date Thu Jun 27 2019
Basin Williston	UWI No. 33-033-00345-00-00
NDIC No. 26582	Field Camel Hump
KB 2837 ft	TD 12375 ft
Latitude 47.005852	Longitude -103.827503

