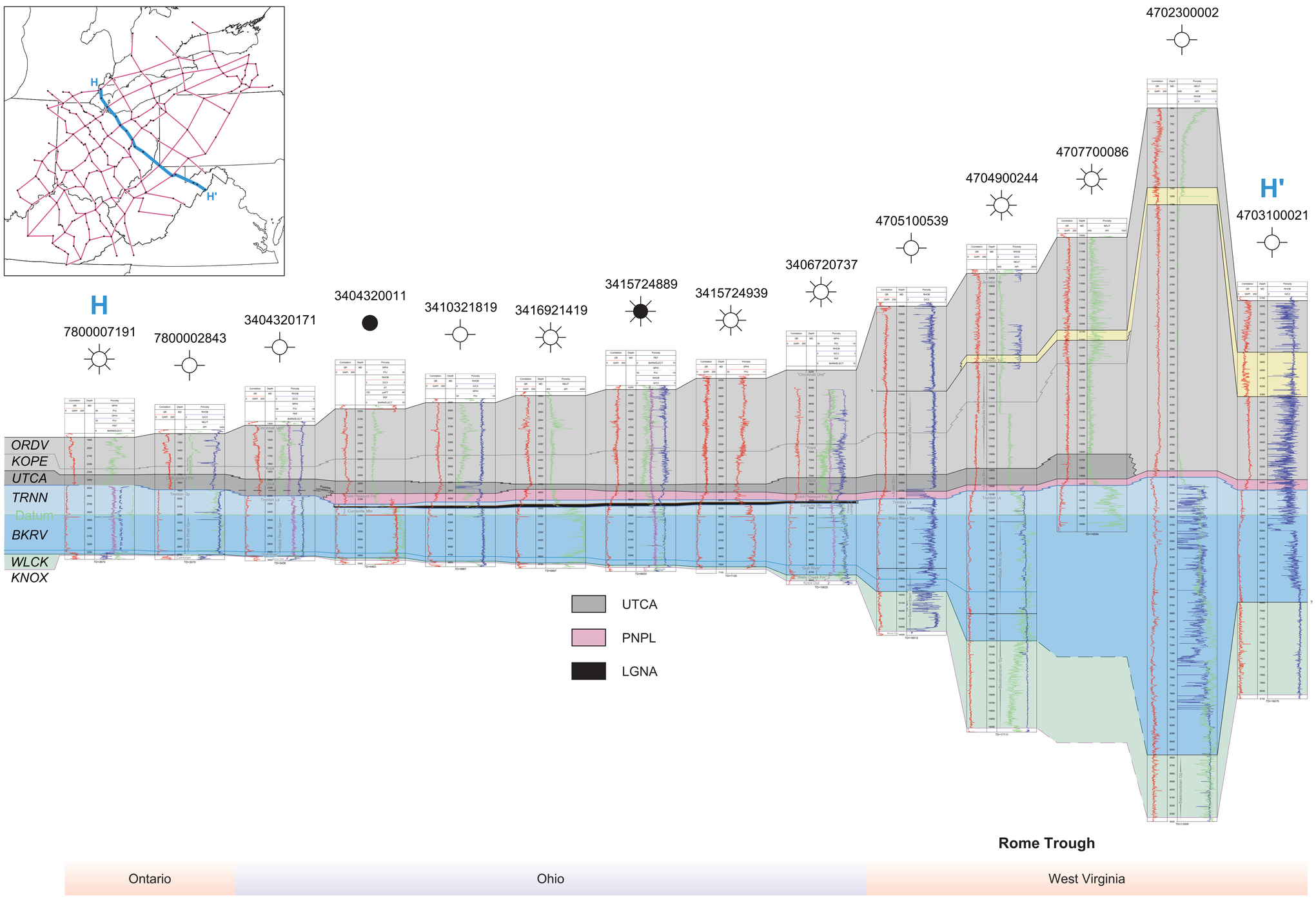
Geologic Overview and Activity Update for the Utica-Point Pleasant Shale Play in Ohio



Stratigraphic cross section of the top of Ordovician to Knox Dolomite from Ontario to West Virginia, illustrating the Utica and Point Pleasant facies.

Summary of Core Analyses for the Barth No. 3 (APINO 340312838) in Coshocton County, Ohio

Weight percent	Raw Data NORMALIZED to sum to 100%							
Well name	**FT Barth**							
Sample ID	1	2	3	4	5	6	7	8
Sample depth (ft)	5,655.5	5,661.4	5,675.0	5,678.4	5,681.5	5,684.5	5,708.5	5,747.5
Non-clay fraction								
Quartz	15.9	16.6	14.9	16.7	16.7	18.7	2.1	11.6
K-Feldspar	1.1	1.1	1.3	1.4	1.4	1.3	0.0	1.7
Plagioclase	4.0	5.0	3.8	4.1	5.0	4.8	0.0	3.8
Apatite	1.2	1.2	1.6	1.4	1.9	1.4	0.5	2.4
Pyrite	1.0	1.5	2.7	1.4	2.0	1.0	0.4	1.6
Calcite	41.1	36.2	45.7	41.1	46.7	38.3	92.8	45.9
Dolomite	5.2	3.1	3.5	4.1	5.8	7.9	1.1	3.8
Total	**69.4**	**64.7**	**73.5**	**70.2**	**79.6**	**73.4**	**96.8**	**70.7**
Clay fraction								
Mixed-layer ILLITE/SMECTITE (includes R3)	4.0	7.0	5.2	6.3	3.7	5.9	0.0	7.3
Illite + mica	24.7	26.7	20.5	22.6	16.3	20.1	3.2	21.2
Chlorite	1.9	1.6	0.8	0.9	0.4	0.6	0.0	0.8
Total	**30.6**	**35.3**	**26.5**	**29.8**	**20.4**	**26.6**	**3.2**	**29.3**
Grand total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
% Expandable layers in I/S	11.5	28.1	24.9	28.1	27.3	29.7	n/a	26.6
% I/S to Illite in <1.0um fraction	23.4	34.4	38.4	37.8	44.0	41.8	0.0	49.9
% Expandable I/S layers in sample	0.46	1.97	1.30	1.78	1.01	1.76	n/a	1.93
No TOC at time of regression								

api #	Top "Depth," feet	Well	A-R Bulk "Density," gm/cc	Dry Bulk "Density," gm/cc	Dry Grain "Density," gm/cc	Dry Helium "Porosity," % of BV	Dry Press Decay "Permeability," md
34031228380000	5,630.40	Fred T. Barth 3	2.65	2.63	2.74	4.1	2.41E-05
34031228380000	5,640.80	Fred T. Barth 3	2.55	2.53	2.67	5.2	1.09E-04
34031228380000	5,660.00	Fred T. Barth 3	2.55	2.53	2.65	4.7	2.04E-04
34031228380000	5,664.00	Fred T. Barth 3	2.54	2.52	2.64	4.5	5.70E-05
34031228380000	5,674.50	Fred T. Barth 3	2.50	2.48	2.65	6.5	2.19E-04
34031228380000	5,678.50	Fred T. Barth 3	2.53	2.50	2.64	5.2	3.39E-04
34031228380000	5,681.50	Fred T. Barth 3	2.54	2.52	2.66	5.3	1.26E-04
34031228380000	5,682.50	Fred T. Barth 3	2.49	2.46	2.64	6.8	6.63E-05
34031228380000	5,684.50	Fred T. Barth 3	2.50	2.47	2.65	6.6	1.68E-04
34031228380000	5,701.60	Fred T. Barth 3	2.56	2.54	2.65	4.0	4.70E-05
34031228380000	5,704.60	Fred T. Barth 3	2.60	2.59	2.69	3.7	8.96E-05
34031228380000	5,715.50	Fred T. Barth 3	2.60	2.58	2.69	4.1	2.23E-05
34031228380000	5,716.90	Fred T. Barth 3	2.59	2.57	2.67	3.8	4.83E-05
34031228380000	5,734.00	Fred T. Barth 3	2.59	2.57	2.68	4.0	1.60E-04
34031228380000	5,737.00	Fred T. Barth 3	2.56	2.54	2.65	4.1	3.81E-05
34031228380000	5,738.50	Fred T. Barth 3	2.57	2.55	2.66	4.0	1.38E-04
34031228380000	5,745.50	Fred T. Barth 3	2.57	2.56	2.65	3.5	6.98E-05

Weatherford LABORATORIES

WFT Labs HH-45711

SUMMARY OF TRIAXIAL COMPRESSIVE TESTS
Saturated with 2% KCl

Dolan Integration Group
Redman Barth No. 3

Sample No.	Depth (ft)	Confining Pressure (psi)	Pore Pressure (psi)	Compressive Strength (psi)	Static Young's Modulus ($x10^6$ psi)	Static Poisson's Ratio
5661VRM	5,661.50	2,500	500	19,493	1.87	0.23
5680VRM	5,680.50	2,500	500	19,921	2.15	0.23
5683VRM	5,683.50	2,500	500	25,790	3.11	0.25
5790VRM	5,790.00	2,500	500	19,397	1.93	0.25

Weatherford LABORATORIES

WFT Labs HH-45711

SUMMARY OF ULTRASONIC VELOCITIES AND DYNAMIC ELASTIC PARAMETERS
Saturated with 2% KCl

Dolan Integration Group
Redman Barth No. 3

Sample No.	Depth (ft)	Confining Pressure (psi)	Bulk Density (g/cc)	Ultrasonic Wave Velocity				Dynamic Elastic Parameter			
				Compressional		Shear		Young's Modulus ($x10^6$ psi)	Poisson's Ratio	Bulk Modulus ($x10^6$ psi)	Shear Modulus ($x10^6$ psi)
				ft/sec	msec/ft	ft/sec	msec/ft				
5661VRM	5,661.50	2,500	2.56	13,418	74.53	7,636	130.96	5.06	0.26	3.52	2.01
5680VRM	5,680.50	2,500	2.55	13,789	72.52	8,172	122.37	5.64	0.23	3.47	2.29
5683VRM	5,683.50	2,500	2.59	15,272	65.48	8,801	113.62	6.78	0.25	4.54	2.71
5790VRM	5,790.00	2,500	2.61	14,293	69.96	8,074	123.85	5.79	0.27	4.12	2.29

Weatherford LABORATORIES

SHALE ROCK PROPERTIES
SUMMARY OF ROUTINE CRUSHED CORE ANALYSES RESULTS
As-received and vacuum dried at 212°F

Dolan Integration Group
Redman Barth No.3
USA

HH-45711
1-05-10

Sample ID	Sample "Depth," feet	A-R Bulk "Density," gm/cc	A-R Grain "Density," gms/cc	A-R Water "Saturation," % of PV	A-R Oil "Saturation," % of PV	A-R Gas "Saturation," % of PV	A-R Gas Filled "Porosity," % of BV	A-R Press Decay "Permeability," md	Dry Bulk "Density," gm/cc	Dry Grain "Density," gm/cc	Dry Helium "Porosity," % of BV	Dry Press Decay "Permeability," md
1SRP	5,661.50	2.54	2.58	11.7	52.3	36.0	1.8	3.68E-05	2.51	2.64	4.9	5.63E-04
2SRP	5,680.50	2.52	2.57	10.4	54.5	35.1	1.8	2.68E-05	2.50	2.63	5.2	4.30E-04
3SRP	5,683.50	2.57	2.61	6.0	67.0	27.0	1.5	2.25E-05	2.54	2.69	5.4	8.20E-04
4SRP	5,740.00	2.59	2.61	14.5	66.6	19.0	0.8	9.00E-06	2.56	2.67	4.1	3.18E-04
Average values:		2.56	2.59	10.7	60.1	29.3	1.5	2.38E-05	2.53	2.66	4.9	5.33E-04

As-received bulk volumes and bulk densities were determined on intact bulk sample material. The bulk material was crushed and all other analysis reported herein were conducted on the crushed material.

Lawrence H. Wickstrom, Ronald A. Riley, Matthew S. Erenpreiss, and Christopher J. Perry
Ohio Department of Natural Resources, Division of Geological Survey ▫ 2045 Morse Rd., Bldg. C-1, Columbus, OH 43229-6693