STATEWIDE ASSESSMENT OF GAS POTENTIAL IN THE UTICA SHALE, NY

Final Report

Prepared for

THE NEW YORK STATE ENERGY RESEARCH AND DEVELOPMENT AUTHORITY

Albany, NY

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ABSTRACT

Advances in horizontal drilling and high volume multi-stage hydraulic fracturing have helped to unlock vast natural gas resources in organic–rich shales. The Ordovician Utica Shale has demonstrated varying amounts of potential across the Appalachian Basin, including New York. The purpose of this study was to define a fairway for potential natural gas production in the Utica Shale of New York. To accomplish this goal, cuttings from 82 wells and 2 cores were sampled and analyzed for total organic carbon (TOC), carbonate content, thermal maturity, and rock-eval pyrolysis. This data was then used to make a series of maps and cross sections. Our TOC analyses indicate that the Utica in NY has less organic carbon (1 to 3 wt%) than most productive shales. It is also super-mature, with R_o values greater than 4.0. These factors may conspire to make the Utica a sub-economic play in New York, but there is still a large area (5,000 mi^2) where the Utica may be productive. Data from this study was also used to calculate the CO_2 storage capacity of the Utica fairway should it be used as a sequestration reservoir. Capacities were calculated using three different methods and results range from 0.13 to 0.33 gigatons of CO_2.

Keywords: Utica Shale, total organic carbon, organic-rich shale, carbon sequestration

ACKNOWLEDGMENTS

We express our gratitude to NYSERDA for their financial support. We'd also like to thank everyone in the Oil & Gas Office of the New York State Geological Survey / New York State Museum, including several volunteers who helped prepare samples in our lab. Humble GeoChem for running the rock-eval analyses, and Garrecht Metzger for his guidance in developing our technique for measuring carbonate content.

TABLE OF CONTENTS

FIGURES

FIGURES (continued)

TABLES

EXECUTIVE SUMMARY

The combination of horizontal drilling and high volume multi-stage hydraulic fracturing has helped to unlock vast natural gas resources in organic–rich shales. The shale with the best potential to produce in New York is the Middle Devonian Marcellus Shale although there is also significant potential in the Ordovician Utica Shale. There have been several Utica tests for gas in western Pennsylvania and some of these wells have had encouraging results. There is also something of an oil boom in the Utica Shale and associated carbonates underway in Ohio. The purpose of this study was to map out a fairway for potential natural gas production in the Utica Shale in New York. In order to accomplish that goal we sampled cuttings from more than 40 wells and analyzed them for total organic carbon (TOC), thermal maturity and rock-eval pyrolysis and made a series of maps and cross sections. The report includes all of the data promised in the proposal for Tasks 3, 4 and 5.

The Utica Shale is composed of three formations. The Upper Indian Castle is younger than the Trenton Limestone and the Lower Indian Castle, Dolgeville and Flat Creek Formations are time-equivalent to the Trenton. These formations have been picked on logs and can be correlated with some confidence.

The key factors in mapping the fairway are TOC, thickness of organic-rich strata, burial depth, mineralogy, thermal maturity and the degree of overpressure. Productive shales are likely to have TOC >2% with higher TOC being better in most cases. Porosity in the shales commonly forms in organic matter that has matured and expelled hydrocarbons. Greater amounts of organic carbon result in higher porosities after the shales have entered the gas window. Organic-rich shales generally have lower density than organic-poor shales and density logs have been used to map the organic-rich units across the state. The thickness of organic-rich strata is a primary control on gas in place and all other things being equal, thicker is better in most cases. The thickness of the entire organic-rich Utica and time-equivalent Trenton Limestone have been mapped as well as the thickness of individual members of the shale. The organic-rich section is thickest in the eastern part of the basin and thins to zero in western New York. TOC values for the organic-rich Utica generally range from 1 to 3%, with few values over 3%. Thickness of the organic-rich section ranges from 0 to 1,300 feet. The section is thickest in grabens that were active during deposition.

The burial depth has been determined by making a structure contour map of the top of the organic-rich Utica. The Utica ranges from zero burial depth at the outcrop belt to more than 10,000 feet deep along the Pennsylvania border. Most productive shales in the United States produce from more than 4,000 feet, but may be productive as shallow as 3,000 feet. Hydraulic fracturing of horizontal wells would not work well at depths shallower than 2,000 to 3,000 feet because the stress field changes and the necessary vertical fractures would no longer form.

Thermal maturity values have been measured using calculated vitrinite reflectance from rock-eval data and conodont alteration indices (CAI). Most of the organic-rich shale with TOC >1% is in the dry gas window. While there have been discussions regarding an upper limit to thermal maturity, the current consensus is that high thermal maturity should not be misconstrued as evidence that gas has burnt off. Thermal maturity should be used to define the maturation state of the hydrocarbon rather than determine its presence.

Another critical factor in developing a fairway map is the degree of overpressure. We have no data for reservoir pressure, but have heard anecdotally that the Utica is not overpressured in New York. The Marcellus is overpressured in the area where it produces at high rates in Pennsylvania. Overpressure may not be essential but appears to help. Utica equivalent strata within the Trenton Limestone are overpressured in some areas.

Based on this analysis, there is no area of probable economic gas production in the Utica of New York. Probable in this case means there is a better than 50% chance of economic production. The low TOC, lack of non-organic porosity, and apparent lack of overpressure all add geologic risk to the Utica in New York. There is a large area of possible production in Otsego, Delaware, Sullivan and Broome Counties with lesser potential in Chenango and Tioga Counties. Possible in this case means there is less than 50% chance of economic production. There is also some potential in time-equivalent strata of the Trenton Limestone. This

is essentially an organic-rich shale interbedded with limestone play that occurs over a broader area including Cortland and Steuben Counties.

Data from this study is also used to evaluate the potential to sequester carbon dioxide in the organic-rich Utica as a means of mitigating greenhouse gas emissions. CO_2 capacity estimates for the Utica fairway in New York have been calculated using natural gas production potential, pore volume from TOC, and sequestration with the adsorption of carbon dioxide. All three calculations estimate the sequestration potential of the Utica in New York to be between 0.1 and 0.4 gigatons of CO_2, or 1 to 2 years of the state's current CO_2 output.

Section 1
INTRODUCTION

The combination of horizontal drilling and high volume multi-stage hydraulic fracturing has helped to unlock vast natural gas resources in organic–rich shales. The shale with the best potential to produce in New York is the Middle Devonian Marcellus Shale although there is significant potential in the Ordovician Utica Shale as well. There have been several Utica tests for gas in western Pennsylvania and some of these wells have had encouraging results. There is also something of an oil boom in the Utica Shale and associated carbonates underway in Ohio.

The purpose of this study was to define a fairway for potential natural gas production from the Utica Shale in New York. To accomplish this goal we sampled two bedrock cores and the drill cuttings from more than 60 wells. Various amounts of these samples were analyzed for total organic carbon (TOC), thermal maturity, carbonate content, and rock-eval pyrolysis. The results of these analyses have been used to make a series of maps and cross sections. We have also used this data to calculate approximate storage capacities should the Utica Shale be used as a carbon sequestration reservoir. This report includes all of the data generated during the project.

Section 2
BACKGROUND

2.1 DEPOSITIONAL ENVIRONMENT

The Utica Shale was deposited in the Appalachian Basin during the early stages of the Middle to Late Ordovician Taconic Orogeny. During this time New York was situated at approximately 30° south latitude, which is about as far from the equator as northern Florida is today (Figure 1). The Utica was deposited during a time of warm global climate, and the basin was likely seasonal at that time. The Taconic Orogeny occurred when a volcanic island arc collided with North America creating a foreland basin. Prior to this collision, deposition in central New York was mainly in an intracratonic basin with highs to the north and east and a subtle high to the west.

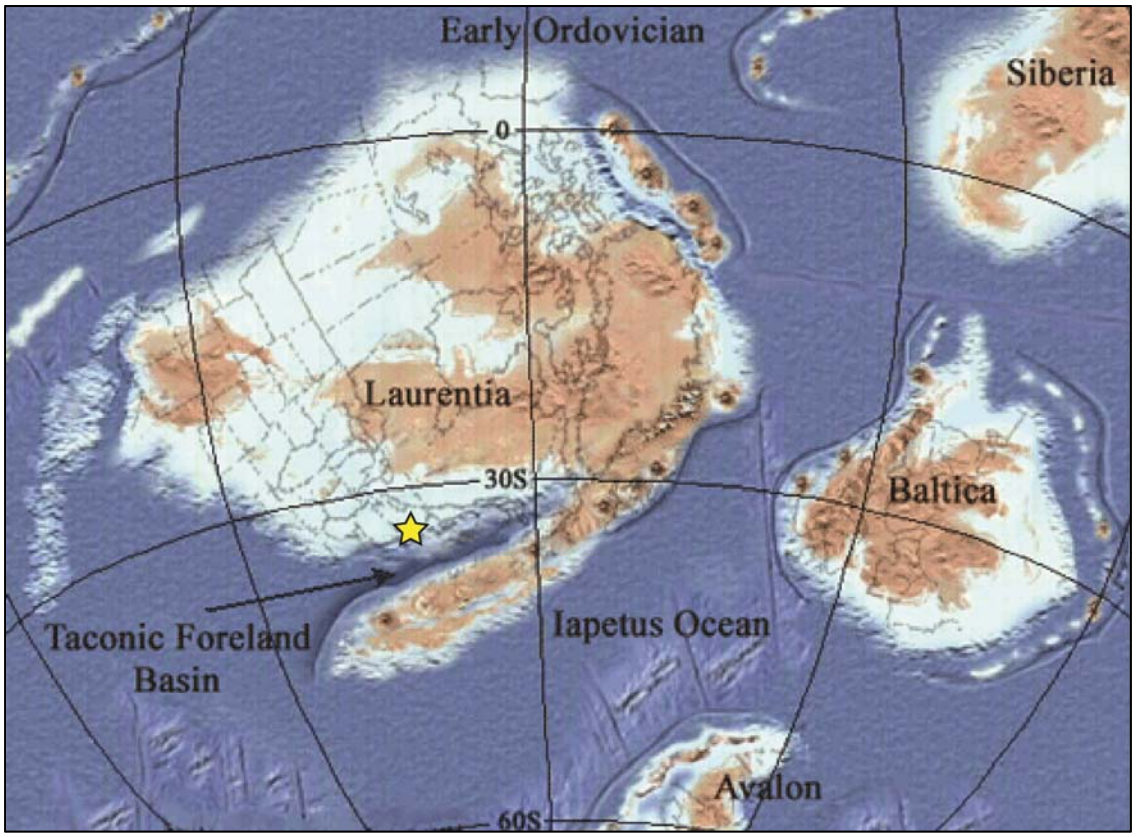

Figure 1. Paleomap of Laurentia during the Early Ordovician (star marks NY)
Source: Blakey http://jan.ucc.nau.edu/~rcb7/

Thrust-loading of the North American plate led to the reactivation of NNE-trending extensional faults (Jacobi and Mitchell, 2002) as well as some NW-SE and E-W trending strike slip faults. These faults were likely preexisting, having initially formed during the Late Precambrian Iapetan rifting. The extensional faults were actively moving during Utica deposition and greatly impact facies distribution and thickness of

organic-rich strata (Figure 2) (Bradley and Kidd, 1991). There is a major down-dropped section in the eastern fault system (called the Hoffman's Fault in outcrop). There are turbidites and organic-poor clastics on the eastern, downthrown, side and organic-rich calcareous mudrock on the western, upthrown side.

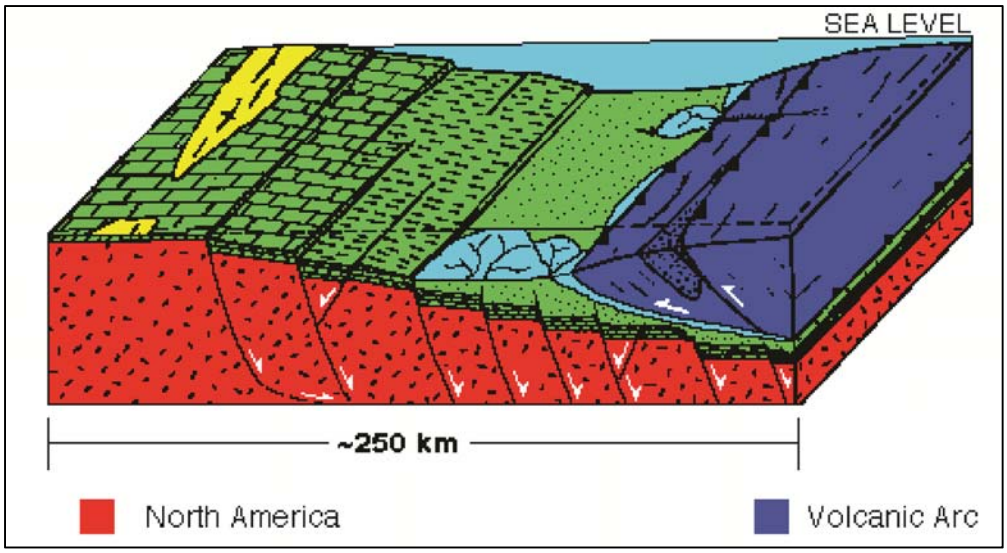

Figure 2. Geologic interpretation of extensional faulting during the Taconic Orogeny
Source: Bradley and Kidd, 1991

Figure 3 shows a map of the faults in the Mohawk Valley. The faults cut through all strata from the Utica downward but do not offset Silurian and Devonian strata. Some faults have over 3,000 feet of offset although most are a few tens or hundreds of feet.

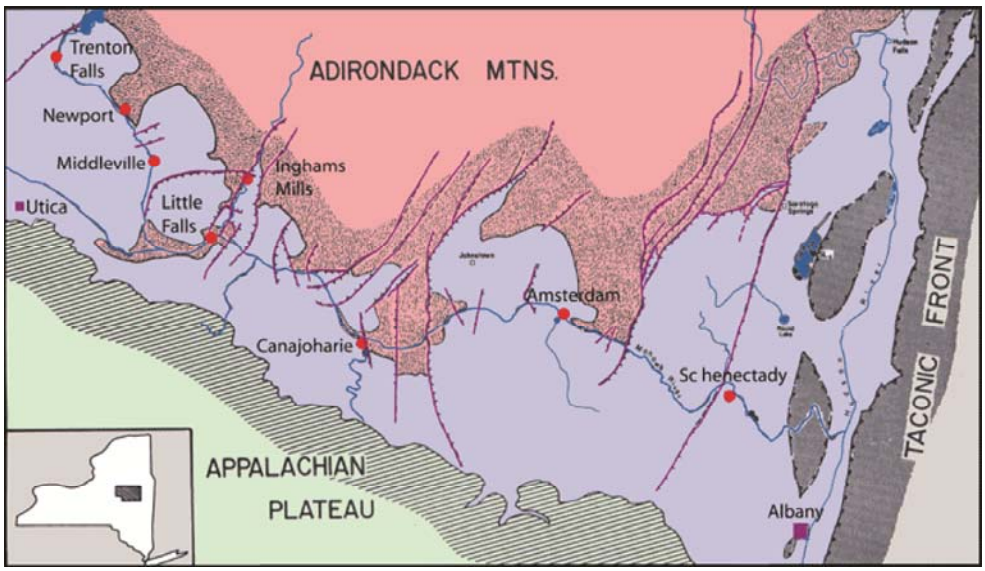

Figure 3. Map of northeast – southwest trending normal faults in the Mohawk Valley
Source: modified from Hay and Cisne, 1988

2.2 STRATIGRAPHIC SETTING

The Utica Shale is both time-equivalent and younger than the Trenton Limestone (Figure 4). In the figure, members of the Utica are dark gray while the Trenton is in shades of blue. The oldest part of the Utica Shale is called the Flat Creek Formation and it consists primarily of organic-rich calcareous mudrock with some interbeds of limestone. In the east, the Flat Creek immediately overlies an unconformity which separates it from the Upper Cambrian Beekmantown and to the west, it overlies some thin beds of Trenton Limestone. The Flat Creek grades laterally into the Denley and Rust Formations of the Trenton Limestone and these members have some organic-rich layers interbedded with what is predominantly limestone. The Flat Creek Formation is overlain by the Dolgeville Formation in most places in the subsurface. The Dolgeville Formation is an interbedded limestone and organic-rich shale that gets progressively shalier to the east. The Dolgeville is overlain by the Indian Castle Formation. The Indian Castle is subdivided into a lower organic-rich and carbonate-rich section and an upper section that is clay-rich and organic-poor for the most part.

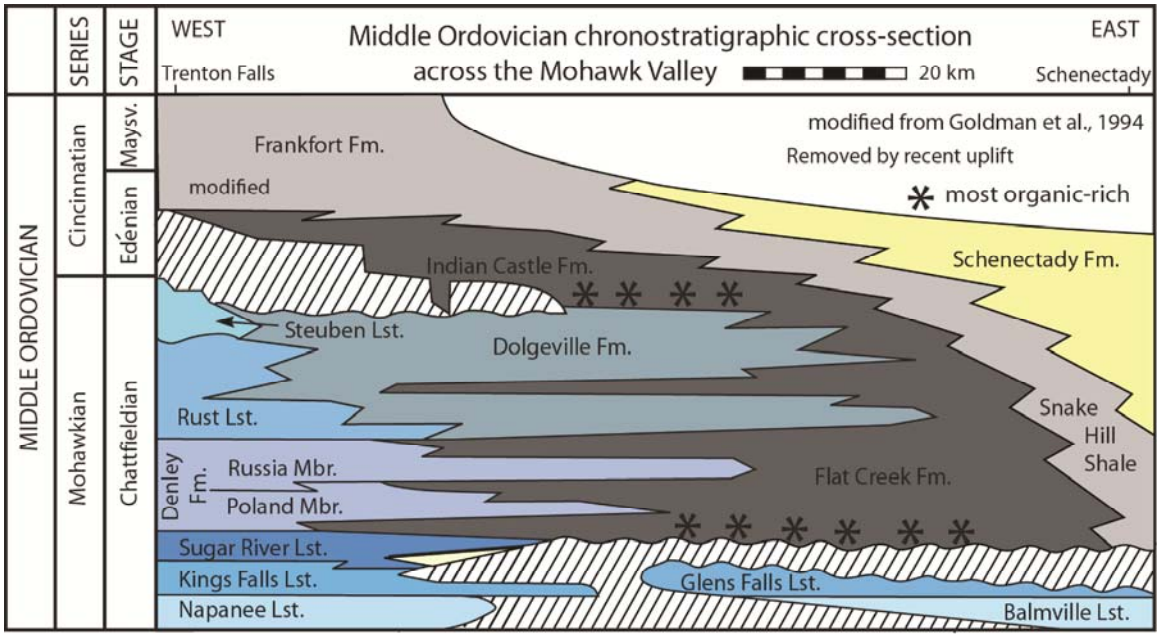

Figure 4. Middle Ordovician chronostratigraphic cross-section across the Mohawk Valley
Source: modified from Goldman et al., 1994

There is an enigmatic unconformity to the west called the Thruway Disconformity (Jacobi and Mitchell, 2002) that overlies the Trenton and Dolgeville Formations and is onlapped by and time equivalent to the Indian Castle Formation. The portion of Lower Indian Castle that is time-equivalent to the unconformity is the most organic-rich interval in the Formation. This is quite similar to the Marcellus Shale where the Union Springs Formation is the most organic-rich and is also time-equivalent to an unconformity farther to the west. The Thruway Disconformity has been variously interpreted as a drowning unconformity (Baird

and Brett, 2002), a slump scar (Jacobi and Mitchell, 2002), and a subaerial unconformity that was then further altered during transgression (Smith and Leone, 2011).

The Upper Indian Castle is a clay-rich shale that generally has lower organic content than the underlying Lower Indian Castle Shale. A second enigmatic unconformity occurs to the west between the Upper and Lower Indian Castle that has been called the Honey Hill Disconformity (Baird and Brett, 2002).

The Utica is overlain by siltstones and shales of the Lorraine Formation which is in turn overlain by the Queenston Sandstone. These are part of a prograding clastic wedge coming from the Taconic Mountains to the present-day east.

Figure 5 shows the Little Falls Graben as mapped by Baird and Brett (2002). The cross hatched formation is the Lower Indian Castle which is organic-rich Utica that thickens by about 500 feet (150 meters) across the Little Falls fault zone. The intervals between each of the ash beds thicken proportionally suggesting that the graben was always nearly full and was constantly filled as the faults moved.

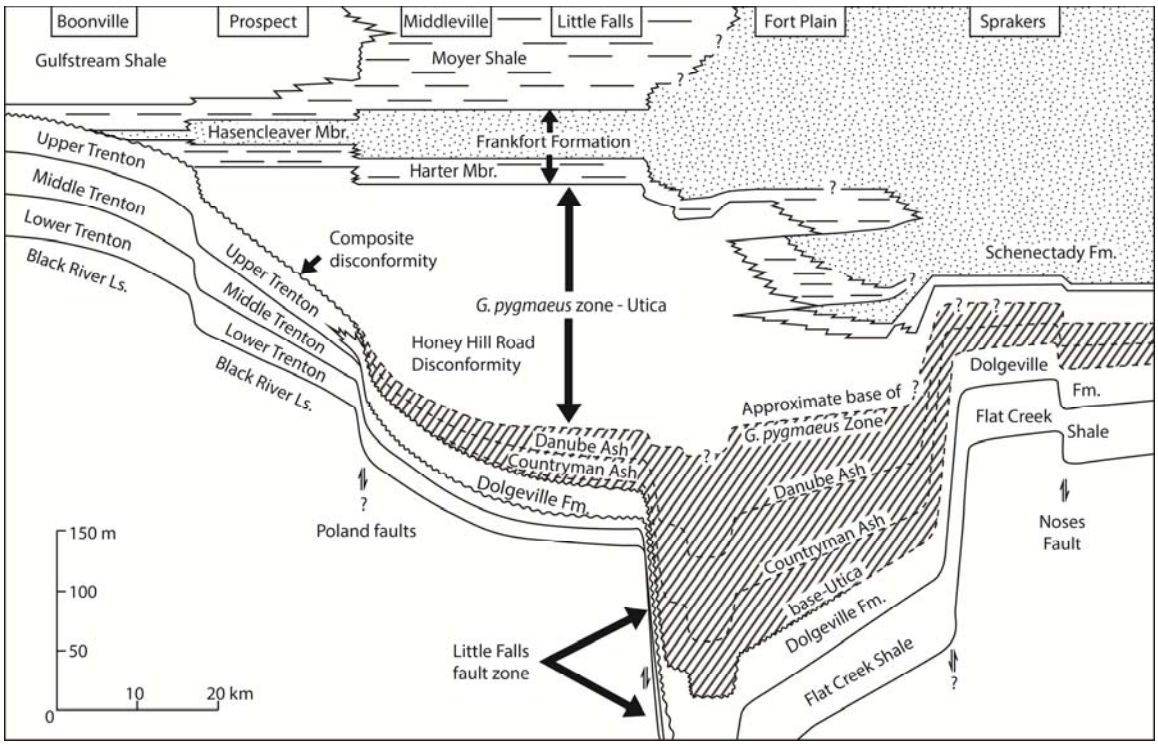

Figure 5. Northeast – Southwest cross section of the Little Falls Graben
Source: Baird and Brett, 2002

Section 3
METHODS

Geochemical analyses on shale as an unconventional play are the same as evaluations for shale as a source rock. Most of the data in this report was produced by sending samples to Humble Geochem who did the rock-eval and some of the TOC analyses. We have since acquired a carbon coulometer and are now running TOC analyses ourselves. All of the data we have produced is included in Appendix A and discussed in Section 4.

3.1 SAMPLING

The main focus of this study was in the Southern Tier and western Catskills regions as earlier work (Weary et al., 2000) suggested. Our decision on where to sample was based on the assumption that the area of greatest Utica potential is in the central to eastern section of the Appalachian basin in New York (Figure 6). A full list of the wells sampled and their locations is available in Table 1.

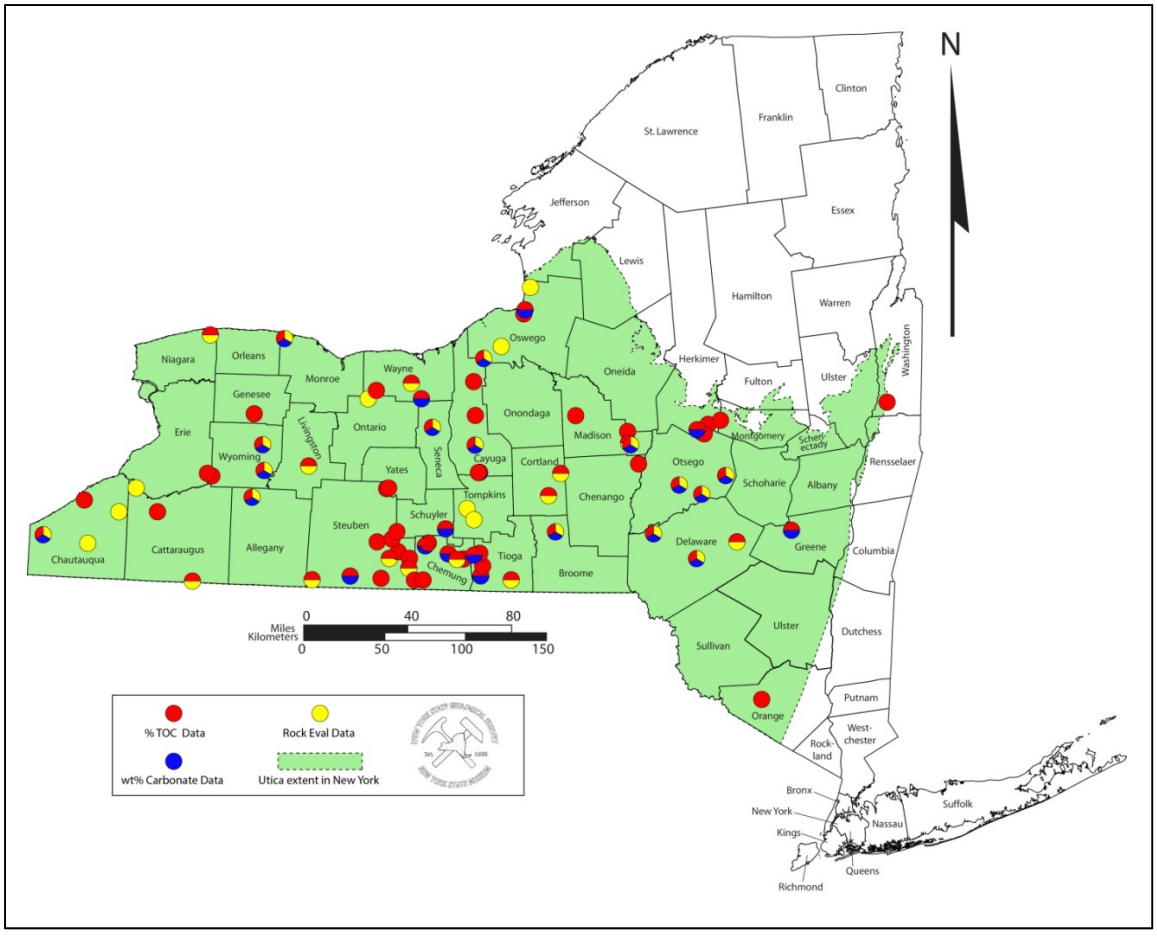

Figure 6. Map of wells sampled for TOC, Carbonate, and Rock Eval analyses

API	County	Latitude	Longitude	Interval Top (feet)	Interval Bottom (feet)	Museum Coulometer TOC	Museum Carbonate	Rock Eval & LECO TOC
31-003-04248-00-00	Allegany	42.47049	-78.15990	5150	6200	X	X	
31-007-05087-00-00	Broome	42.32353	-75.94751	7390	7930	X	X	X
31-009-08581-00-00	Cattaraugus	42.45633	-79.03279	4630	4690			X
31-009-08610-00-00	Cattaraugus	42.37148	-78.84290	5610	6100	X	X	
31-009-09235-00-00	Cattaraugus	42.00872	-78.56849	8220	8840	X		X
31-011-04624-00-00	Cayuga	43.25257	-76.49069	1800	1950	X	X	
31-011-17508-00-00	Cayuga	43.12900	-76.56170	2280	2450	X		
31-011-23158-00-00	Cayuga	42.78496	-76.54262	4880	5740	X	X	
31-011-23840-00-00	Cayuga	42.63874	-76.50601	5470	5820	X	X	
31-011-23982-00-00	Cayuga	42.63714	-76.51396	5380	5750	X	X	
31-011-90001-00-00	Cayuga	42.94479	-76.54432	3300	3680	X		
31-013-04154-00-00	Chautauqua	42.34206	-79.13162	5150	5430			X
31-013-04437-00-00	Chautauqua	42.18364	-79.33754	5200	5960			X
31-013-09939-00-00	Chautauqua	42.41584	-79.37848	3780	3910	X		
31-013-11387-00-00	Chautauqua	42.21912	-79.66331	5100	5740	X	X	X
31-015-10335-00-00	Chemung	42.16908	-76.65865	9193	9789	X		X
31-015-22902-00-00	Chemung	42.25255	-76.86908	8630	9020	X		
31-015-22975-00-00	Chemung	42.23859	-76.88994	8550	9350	X		
31-015-22979-00-00	Chemung	42.19860	-76.72420	8660	9060	X	X	
31-015-23023-00-00	Chemung	42.16977	-76.61182	9300	9700	X		
31-015-23114-00-00	Chemung	42.05261	-76.96368	10540	11090	X		
31-015-23186-00-00	Chemung	42.05234	-76.90128	10000	10600	X		
31-015-23200-00-00	Chemung	42.20359	-76.89282	8440	9020	X		
31-015-23228-00-00	Chemung	42.21804	-76.76679	8500	8650			X
31-017-01160-00-00	Chenango	42.69335	-75.34468	3800	4480	X	X	
31-023-04714-00-00	Cortland	42.51855	-76.00058	6620	7430	X		X
31-023-21500-00-00	Cortland	42.63909	-75.91326	5780	6550	X	X	X
31-025-04214-00-00	Delaware	42.18284	-74.92141	7400	8300	X	X	X
31-025-04364-00-00	Delaware	42.31691	-75.23368	6730	7410	X	X	
31-025-04379-00-00	Delaware	42.27354	-74.62734	5800	6810	X	X	
31-037-10776-00-00	Genesee	42.92051	-78.16708	3300	3800	X		
31-039-03904-00-00	Greene	42.33358	-74.23029	5410	6060	X	X	
31-043-03993-00-00	Herkimer	42.88080	-74.91645	1530	3100	X	X	
31-043-04034-00-00	Herkimer	42.90930	-74.83520	980	1970			X
31-051-04630-00-00	Livingston	42.65030	-77.75568	4250	4810	X	X	
31-053-04032-00-00	Madison	42.79637	-75.40426	3400	4150	X	X	
31-053-09578-00-00	Madison	42.95119	-75.80746	3360	4220	X		
31-053-19485-00-00	Madison	42.80884	-75.41849	3690	4450	X	X	
31-053-19485-00-00	Madison	42.80880	-75.41890	3680	4020			X
31-055-04502-00-00	Monroe	43.33094	-77.96487	950	1160	X	X	
74-NY-5	Montgomery	42.92907	-74.74380	20	770	X		
31-063-04719-00-00	Niagara	43.33600	-78.51255	1050	1300	X		
31-065-03928-00-00	Oneida	42.86804	-75.42618	2800	3490	X		
31-071-01001-00-00	Orange	41.42467	-74.45434	45	5500	X		
31-075-04201-00-00	Oswego	43.63951	-76.10833	400	450			X
31-075-04209-00-00	Oswego	43.31883	-76.34729	1000	1600			X
31-075-12399-00-00	Oswego	43.50873	-76.19538	580	1100	X		
31-075-12447-00-00	Oswego	43.51891	-76.19048	440	1000	X	X	
31-077-04055-00-00	Otsego	42.63099	-74.70775	3350	4320	X	X	
31-077-04547-00-00	Otsego	42.53061	-74.88296	3750	4340	X	X	
31-077-10834-00-00	Otsego	42.58038	-75.04771	4000	4600	X	X	
31-077-23759-00-00	Otsego	42.87342	-74.87927	855	2590	X		
31-097-22935-00-00	Schuyler	42.33042	-76.74683	7570	8350	X	X	

Table 1. List of wells sampled including location, interval, and analyses run (continued on next page)

API	County	Latitude	Longitude	Interval Top (feet)	Interval Bottom (feet)	Museum Coulometer TOC	Museum Carbonate	Rock Eval & LECO TOC
31-097-26017-00-00	Schuyler	42.30947	-77.09966	8200	8900	X		
31-099-04203-00-00	Seneca	42.87627	-76.85822	3450	3910	X	X	
31-101-03924-00-00	Steuben	42.06340	-77.42998	9510	10250	X	X	
31-101-21692-00-00	Steuben	42.53996	-77.18198	5760	6300	X	X	
31-101-21703-00-00	Steuben	42.54352	-77.16739	5700	6220	X		
31-101-22852-00-00	Steuben	42.20130	-77.08621	9200	9470	X		
31-101-22978-00-00	Steuben	42.03217	-77.67735	9940	10000			X
31-101-23054-00-00	Steuben	42.17857	-77.01687	9250	9410			X
31-101-23055-00-00	Steuben	42.16770	-77.00357	9000	9500	X		
31-101-23085-00-00	Steuben	42.16440	-77.14963	8800	9340	X		X
31-101-23155-00-00	Steuben	42.18609	-77.09297	9240	9470	X		
31-101-23190-00-00	Steuben	42.11420	-77.00732	9100	9400	X		
31-101-23958-00-00	Steuben	42.05906	-77.24700	8720	8990	X		
31-101-23985-00-00	Steuben	42.25158	-77.24086	8100	8900	X		
31-101-26011-00-00	Steuben	42.26845	-77.13400	8600	8960	X	X	
31-107-23192-00-00	Tioga	42.06187	-76.26401	10330	10590	X		
31-107-23883-00-00	Tioga	42.08059	-76.48472	10000	10700	X		
31-107-23927-00-00	Tioga	42.19197	-76.53608	9110	9650	X	X	
31-107-23996-00-00	Tioga	42.13414	-76.47124	9300	10000	X		
31-107-26013-00-00	Tioga	42.20284	-76.49390	8500	9200	X		
31-109-04130-00-00	Tompkins	42.44218	-76.59246	7090	7280			X
31-109-04467-00-00	Tompkins	42.38440	-76.54070	7140	7350			X
31-115-18370-00-00	Washington	43.01741	-73.51922	3410	4850	X		
31-117-04754-00-00	Wayne	43.08250	-77.26929	2200	3200	X		
31-117-05114-00-00	Wayne	43.11158	-77.02032	2300	2500	X		
31-117-06719-00-00	Wayne	43.02908	-76.94349	2600	3000	X	X	
31-121-04092-00-00	Wyoming	42.61736	-78.07991	4650	5610	X	X	
31-121-06073-00-00	Wyoming	42.75531	-78.09734	4260	4790	X		
31-121-22520-00-00	Wyoming	42.55355	-78.43856	5280	5500	X		
31-121-22655-00-00	Wyoming	42.57710	-78.45845	4880	5160	X	X	

Table 1 (continued). List of wells sampled including location, interval, and analyses run

The Utica was sampled using mainly cuttings, but also core samples. The first survey included at least one sample from each county where the organic-rich Utica was thought to be present and samples were available. A second pass through the state was used to fill in gaps where the geochemistry looked most promising for better completion.

Two cores were sampled in the project. The Matejka well (API# 31-015-10335-00-00) from Chemung County and the 74-NY-5 well in Herkimer County.

3.2 ROCK-EVAL

Rock Evaluation, rock-eval for short, measures the kerogen quality and remaining volumes of kerogen in a sample. The data generated by this process yields geochemical values of S1, S2, S3, Tmax (ºC), %Ro, HI, OI, S2/S3, S1/TOC, and PI. Samples from 20 wells were sent to Humble GeoChem for rock-eval analysis. The results of these analyses are discussed in Section 4 and can be found in Appendix B.

Samples from well cuttings and cores were prepared and put into an instrument that heats the sample slowly. Four values are obtained during this process (from Tissot and Welte, 1984) (see Figure 7):

S_1 = the amount of free hydrocarbons (gas and oil) in the sample (in milligrams of hydrocarbon per gram of rock). If S_1 >1 mg/g, it may be indicative of an oil show. S_1 normally increases with depth. Contamination of samples by drilling fluids and mud can give an abnormally high value for S_1.

S_2 = the amount of hydrocarbons generated through thermal cracking of nonvolatile organic matter. S_2 is an indication of the quantity of hydrocarbons that the rock has the potential of producing should burial and maturation continue. This parameter normally decreases with burial depths >1 km.

S_3 = the amount of CO_2 (in milligrams CO_2 per gram of rock) produced during pyrolysis of kerogen. S_3 is an indication of the amount of oxygen in the kerogen and is used to calculate the oxygen index (see below). Contamination of the samples should be suspected if abnormally high S_3 values are obtained. High concentrations of carbonates that break down at temperatures lower than 390°C will also cause higher S_3 values than expected.

T_{max} = the temperature at which the maximum release of hydrocarbons from cracking of kerogen occurs during pyrolysis (top of S_2 peak). T_{max} is an indication of the stage of maturation of the organic matter.

Some other common values used in rock-eval pyrolysis are calculated from these measurements. These include:

R_o equivalent = vitrinite reflectance thermal maturity equivalent = 0.0180*Tmax-7.16. This only works when Tmax is reliable and Tmax is only reliable when S2 is >0.2 and S2>S1.

HI = Hydrogen Index = (S2x100)/TOC. This value is used to determine the type of organic matter (lacustrine, marine algae, woody plant material, etc). It can only be determined when S2 is accurate.

TR = Transformation Ratio = S1/S1+S2. This number shows the percentage of hydrocarbons generated out of the total that can possibly be generated.

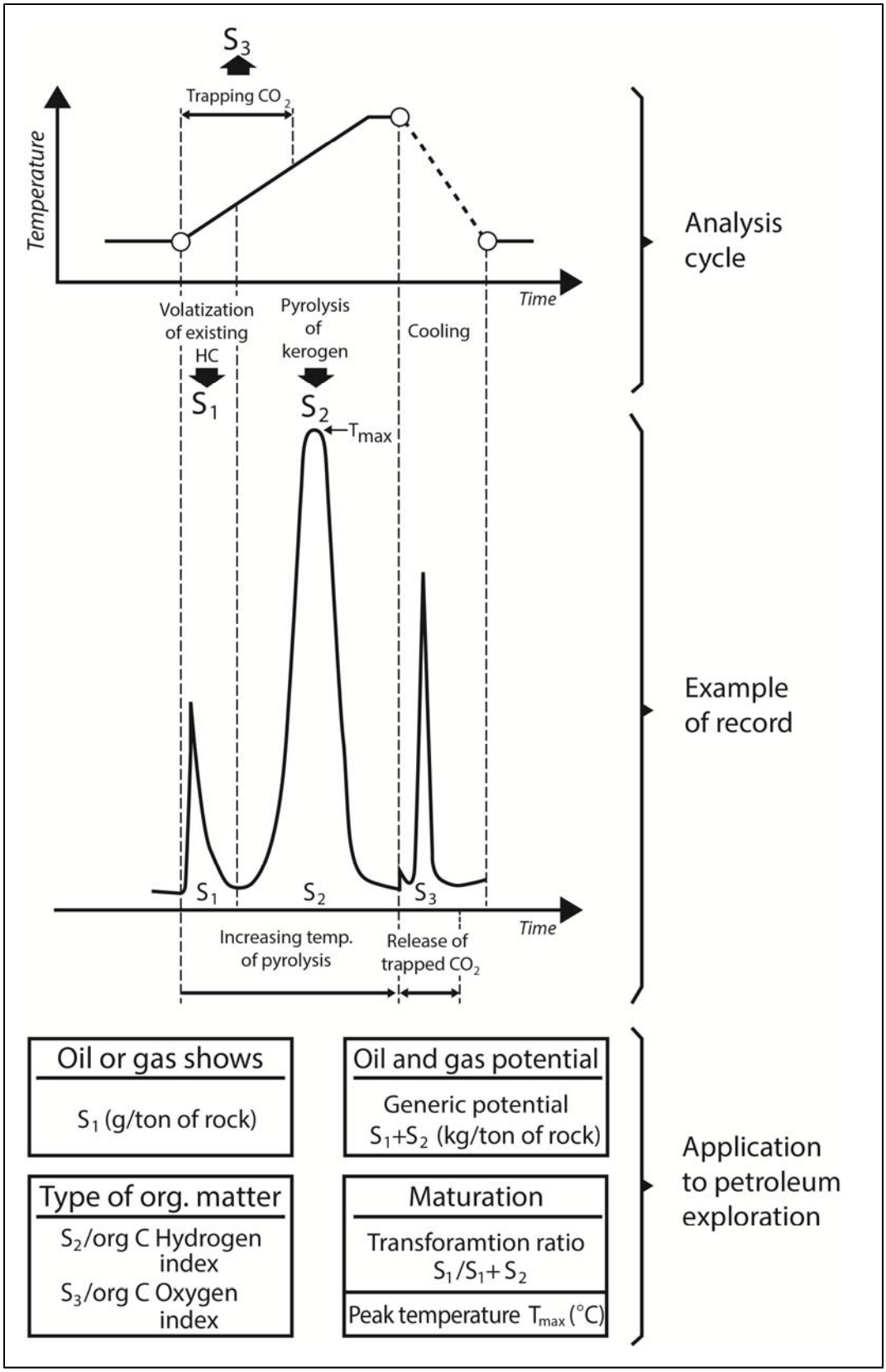

Figure 7. Example of Rock-Eval pyrolysis trace Source: Tissot and Welte, 1984

3.3 TOTAL ORGANIC CARBON

Total organic carbon (TOC) measures the percentage of total rock mass that consists of organic carbon. In the case of the Utica Shale, organic carbon is mostly made up of ancient marine algae. Reported TOC measurements are a fraction of the TOC that was originally in the rock at the time of deposition. As time passed and the rocks were heated during burial, the organic matter became kerogen and then that kerogen expelled oil and other liquid hydrocarbons. As these liquids were expelled, porosity was left behind within the organic matter. With further maturation and expulsion, the amount of porosity grew and the amount of remaining TOC decreased. In supermature rocks such as those found in the Utica Shale of eastern New York, remaining TOC values are probably little more than half the original TOC values.

In the Utica Shale, there is very little porosity other than organic-porosity. Therefore, intervals of high TOC are also likely to have the highest porosity and the best reservoir characteristics. For this project we have sampled two cores and the cuttings from 30 wells.

Approximately 40 to 100 mg of each sample was ground to a fine powder using either a mortar and pestle or shatter box. The powdered samples were then analyzed using a UIC Carbon Coulometer (Figure 8). The coulometer is able to determine the amount of organic carbon by first burning the sample in its furnace. For this study, the furnace temperature was set to 450ºC to ensure that all organ carbon would combust, but no inorganic carbon would burn. Inorganic carbon burns at temperatures greater than 530ºC. Carbon dioxide given off by the burning sample passes to a cell where the amount of carbon is measured using an electrochemical titration. This measurement is then used to calculate the total amount of organic carbon (TOC). The results of these analyses are recorded in Appendix A.

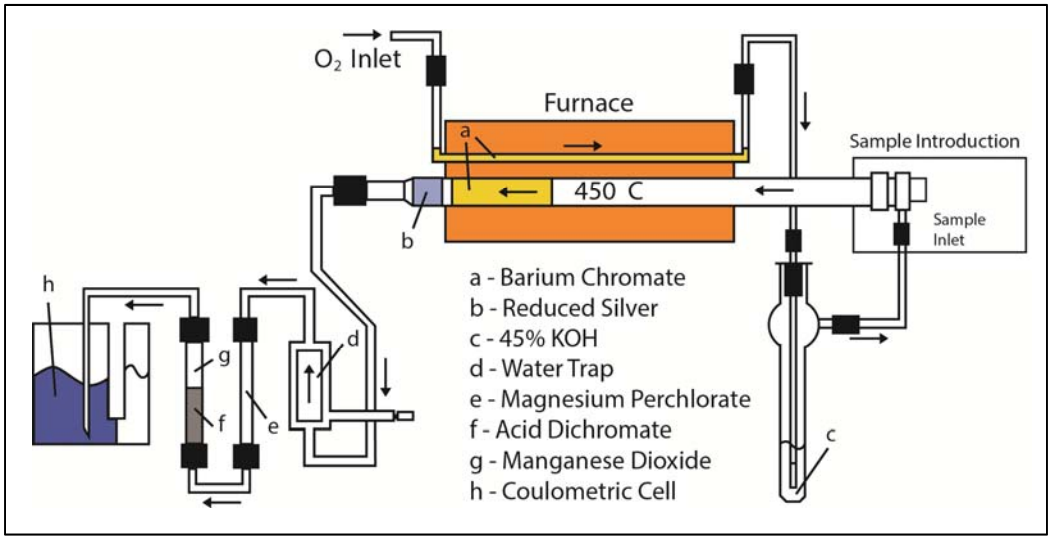

Figure 8. Principles of Carbon Coulometer Operation
Source: UIC website, http://www.uicinc.com/cm180/

TOC values were also reported by as part of Humble GeoChem's rock-eval analysis service. These measurements were made using a LECO carbon analyzer and are reported along with the rock-eval data in Appendix B.

3.4 CARBONATE CONTENT

The carbonate percentages for this study were obtained by reacting powdered rock samples with concentrated hydrochloric acid (HCL). This chemical reaction yeilds carbon dioxide gas (CO_2), a salt ($CaCL_2$), and water (H_2O). The carbon dioxide escapes during the reaction, while the salt and water remains in solution. By measuring the sample before and after the carbonate has been dissolved, its volume can be calculated by simple subtraction.

The process begins with an empty 50ml polypropelene centrifuge vial. This vial is weighed to the nearest 0.0001 of a gram. Next, approximately 1 gram of powered rock sample is added to the vial and it is weighed again. The sample is then exposed to 4ml of 12 normal/12 molar HCL. It is then agitaged in a vortex mixer and allowed to sit for over 12 hours. The vial is then filled to 20ml with ultra pure water and centrifuged forcing the remaining sample materal to collect at the bottom of the vial. The solution is poured off and the process is repeated twice. The vial is placed in an oven for more than 12 hours to evaporate any remaining solution. The vial and remaining sample are then weighed again. The percentage of carbonate is calculated using the following equation:

% Carbonate = 100-((Final Mass of Sample/Initial Mass of Sample)*100)

The results of these analyses are included in Appendix A.

Section 4
DATA

4.1 ROCK-EVAL

Rock-Eval Pyrolysis is most valuable when strata are in the oil, wet gas, or lower dry gas window and is less useful when rocks are in the upper gas window, or are supermature. Our research indicates that much of the Utica in New York is supermature. S_2 values of 0.2 or lower suggest that all of the kerogen that could have cracked to gas has done so and there is no potential to make more gas. In cases where values of S_2 are below 0.2 or where $S_1 > S_2$, the values are considered to be unreliable and therefore cannot be used for other calculations such as T_{max}, HI, TR and R_o equivalent. Nearly all of the samples in the Utica Shale had S_2 values less than 0.2, $S_1 > S_2$, or both. This means that the shale is not currently generating new hydrocarbons in New York State and is all post mature. It also means that very little of the rock-eval pyrolysis data is of much use because most calculations require a valid S_2 value. Still, knowing that the Utica is supermature across the entire area is important.

4.2 THERMAL MATURITY

Thermal maturity maps are commonly made using vitrinite reflectance in rocks that are Silurian and younger. For older rocks, such as the Utica, this method cannot be used because vitrinite is a woody plant material which did not exist during the Ordovician. A vitrinite reflectance (R_o) equivalent can be calculated from rock-eval pyrolysis data using the formula R_o=0.0180*T_{max}-7.16, but a reliable T_{max} value is dependent on an S_2 value greater than 0.2 and, as stated previously, most of the Utica samples do not have reliable S_2 values. The most reliable method for determining thermal maturity in the Ordovician of New York is the discoloration of conodont fossils according to the Conodont Alteration Index (CAI). In fact some people suggest that this can be even more reliable than vitrinite reflectance. A CAI map for the Utica of New York from Weary et al., 2003 is shown in Figure 9. The approximate relationship between CAI and vitrinite reflectance is shown in Figure 10.

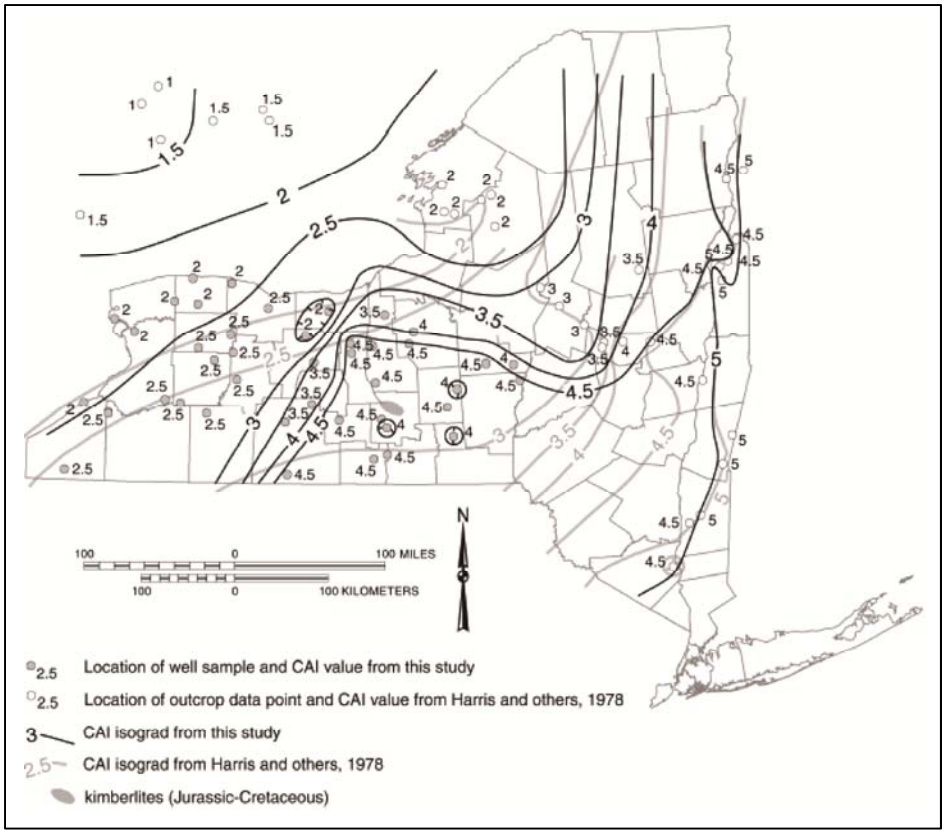

Figure 9. Contour map of CAI values for Utica Shale
Source: Weary et al., 2003

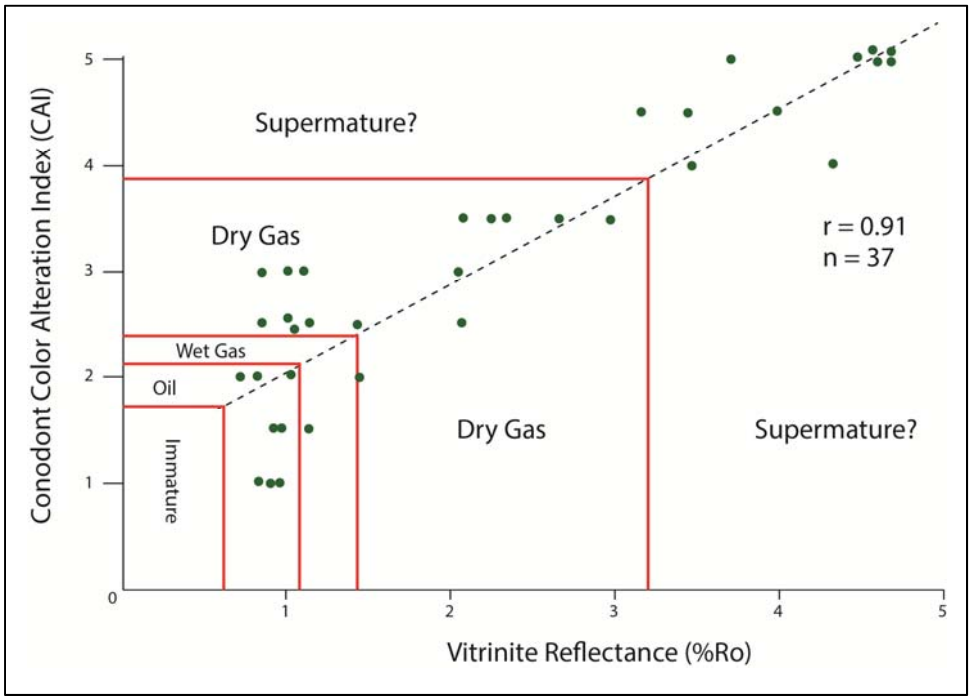

Figure 10. Graph of CAI vs. vitrinite reflectance values
Source: modified from Repetski et al., 2008

Using Figure 10 as a guide, CAI values less than 1.5 are likely to be immature. Values between 1.5 and 2.0 indicate the rocks have entered the oil window. The wet gas window lies between CAI values of 2.0 and 2.5. The dry gas window would then be represented by CAI values greater than 2.5. Figure 11 shows the CAI values for the Utica in New York along with the area where organic-rich shale occurs within the Utica in New York. Based on these studies, the thermal maturity of the Utica Shale is high across most of the area where organic-rich sections occur. This will be discussed further in Section 5.

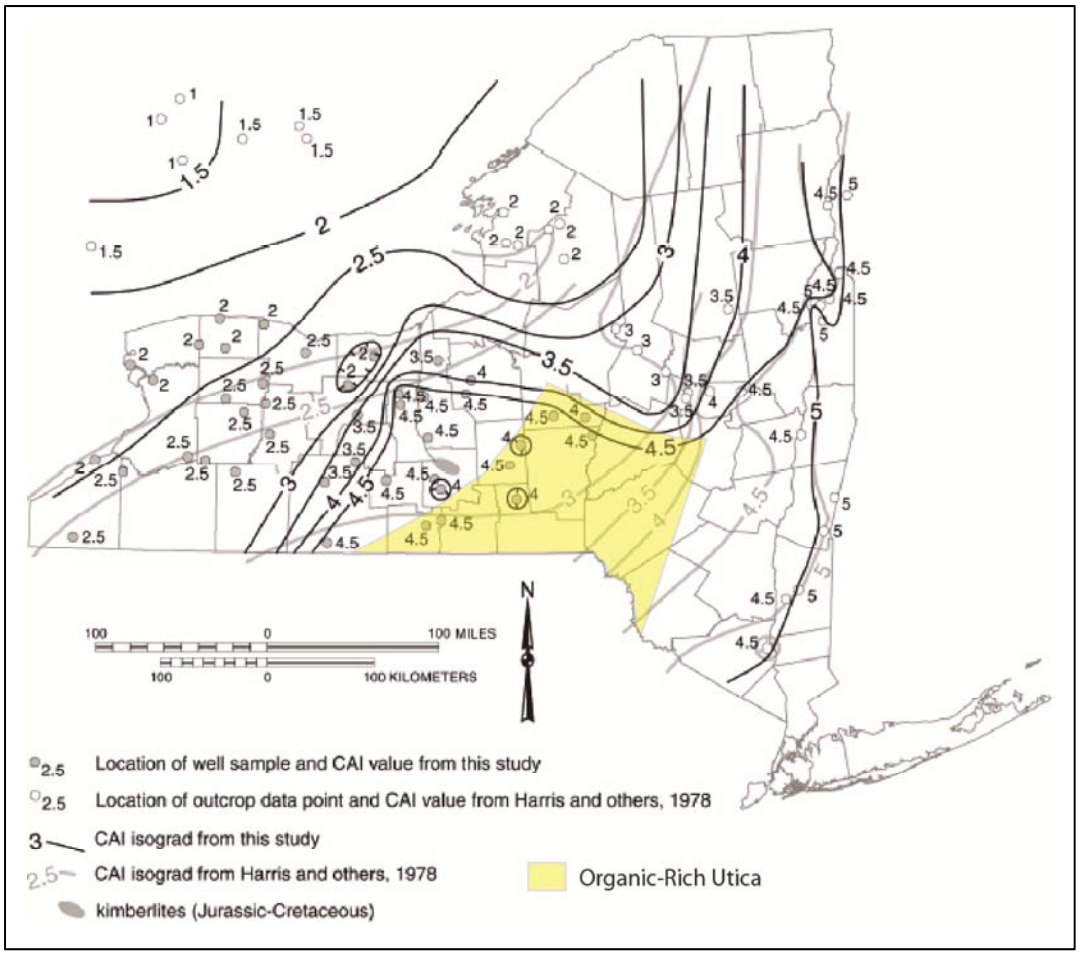

Figure 11. CAI contour map from Figure 10 with area of organic-rich Utica highlighted yellow

4.3 CARBONATE

A total of 1,603 samples, from 27 wells, were analyzed for wt% carbonate. As discussed in Section 2.2, carbonate content is highly variable within the Utica. Limestone beds have been identified in each of the units sampled (Upper Indian Castle, Lower Indian Castle, Dolgeville, and Flat Creek). Therefore, carbonate values for even a single unit can range from less than 1% to over 80%. In addition to the interbedded limestones, much of the shale and mudstone within the Utica appears to be mictric with elevated carbonate

levels within the rock's matrix. Rather than report the results of these analyses as a summary, we stress the importance of reviewing this data as it is presented in Appendix A.

4.4 TOTAL ORGANIC CARBON

In total, 3,648 samples, from 62 wells, were analyzed for TOC. Sampling often extended beyond the Utica into the underlying Trenton and Black River Limestones to ensure the full section was analyzed. The inclusion of these low TOC limestones has a significant effect when calculating average values, therefore we have chosen to present the summary of our data me as a range to more accurately represent the Utica. Previous studies indicate that most productive shales have TOC values from 1.00 to 4.00 wt% (Peters & Cassa, 1994). Our measurements of the Utica Shale lie in a range of 0.50 to 4.86 wt%, with 30% of the samples run falling between 1.00 and 4.00 wt%. A full list of all TOC measurements is available in Appendix A.

Figure 12 shows the TOC distribution in the Lanzilotta #1 well from Delaware County in eastern NY. TOC data is plotted with the gamma ray log and carbonate values. In this area, TOC is highest in the basal 250 feet of the Flat Creek Shale where values are commonly between 2.00 and 3.00 wt%. The Flat Creek also has the highest carbonate content which would increase its brittleness making it a better candidate for hydraulic fracturing. The Flat Creek Shale is likely the lateral equivalent of the basal Point Pleasant Formation in Ohio and Pennsylvania. This well has no density log available, so the TOC values are helpful in understanding the distribution of porosity. The Upper Flat Creek, Dolgeville, and Lower Indian Castle generally have TOC values around 1.50 wt% and would likely have proportionally lower porosity.

Figure 13 shows the TOC distribution in the Strope well in Chemung County in the Southern Tier of New York. This well has some organic-rich strata within the Trenton (laterally equivalent to the Flat Creek), overlain by a dominantly limestone interval, then more organic-rich strata above the Trenton in the clay-rich Indian Castle Formation. The TOC is much higher in the Indian Castle than it is within the Trenton, but the values within the Trenton suggest that there is a possible play. Overpressure is more likely in this interval due to the presence of interbedded limestones that could serve as seals.

Figure 14 shows the TOC distribution in the Olin well in Steuben County in the Southern Tier. This well also has a relatively high TOC interval within the Trenton as well as a thin organic-rich unit overlying the Trenton.

The intra-Trenton play, also known as the Trenton Limestone play, has produced gas in many fields around Lake Erie since the late 1800's (Figure 15). In that area, the Trenton is highly overpressured to the point where it has caused blowouts and dangerous drilling scenarios. Very few of these wells have produced

enough gas to justify commercial development, but horizontal wells and hydraulic fracturing have not been attempted. This interval may hold the greatest promise of any interval in the play.

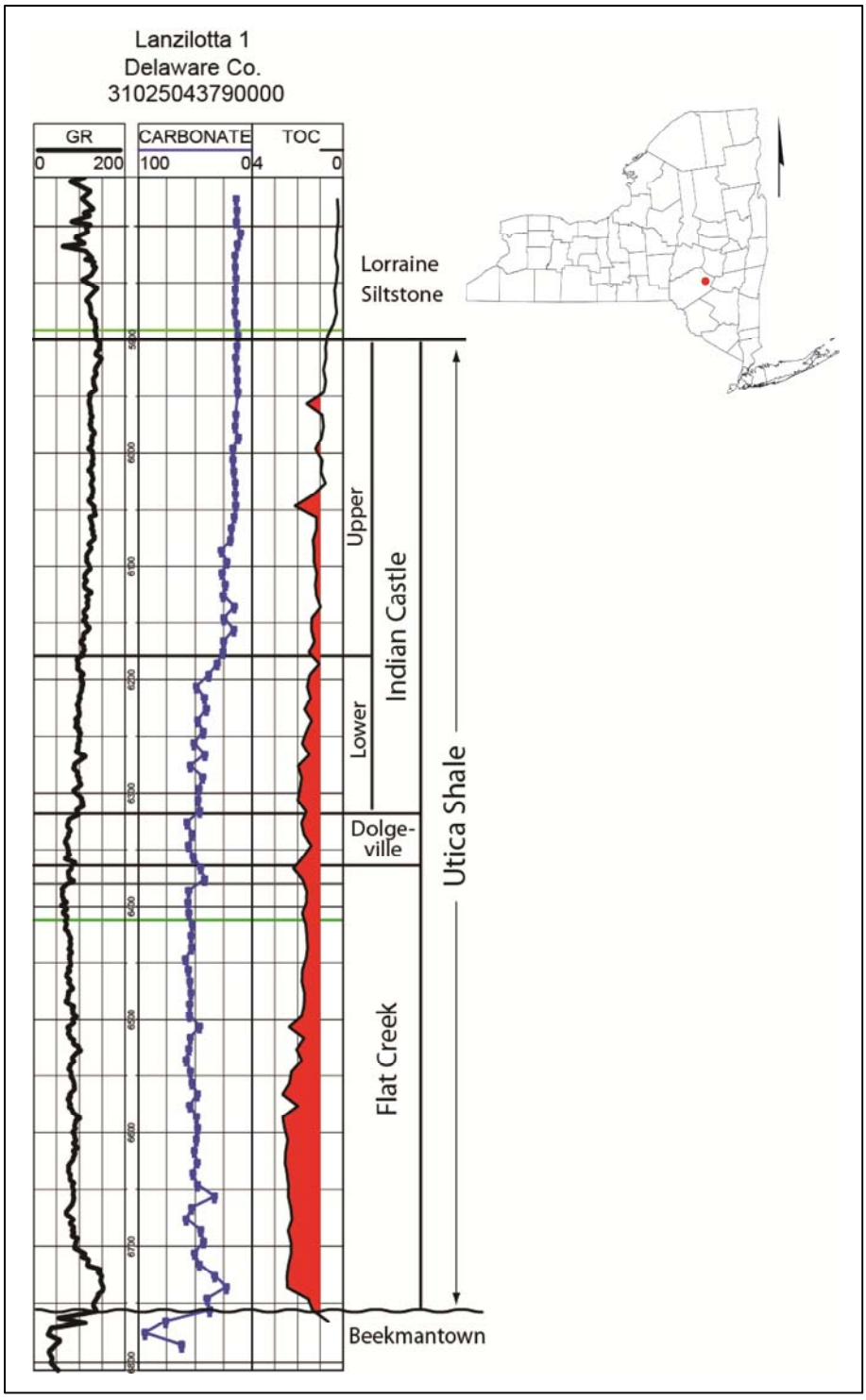

Figure 12. Gamma ray, carbonate content and TOC for the Lanzilotta #1 well in Delaware County, NY

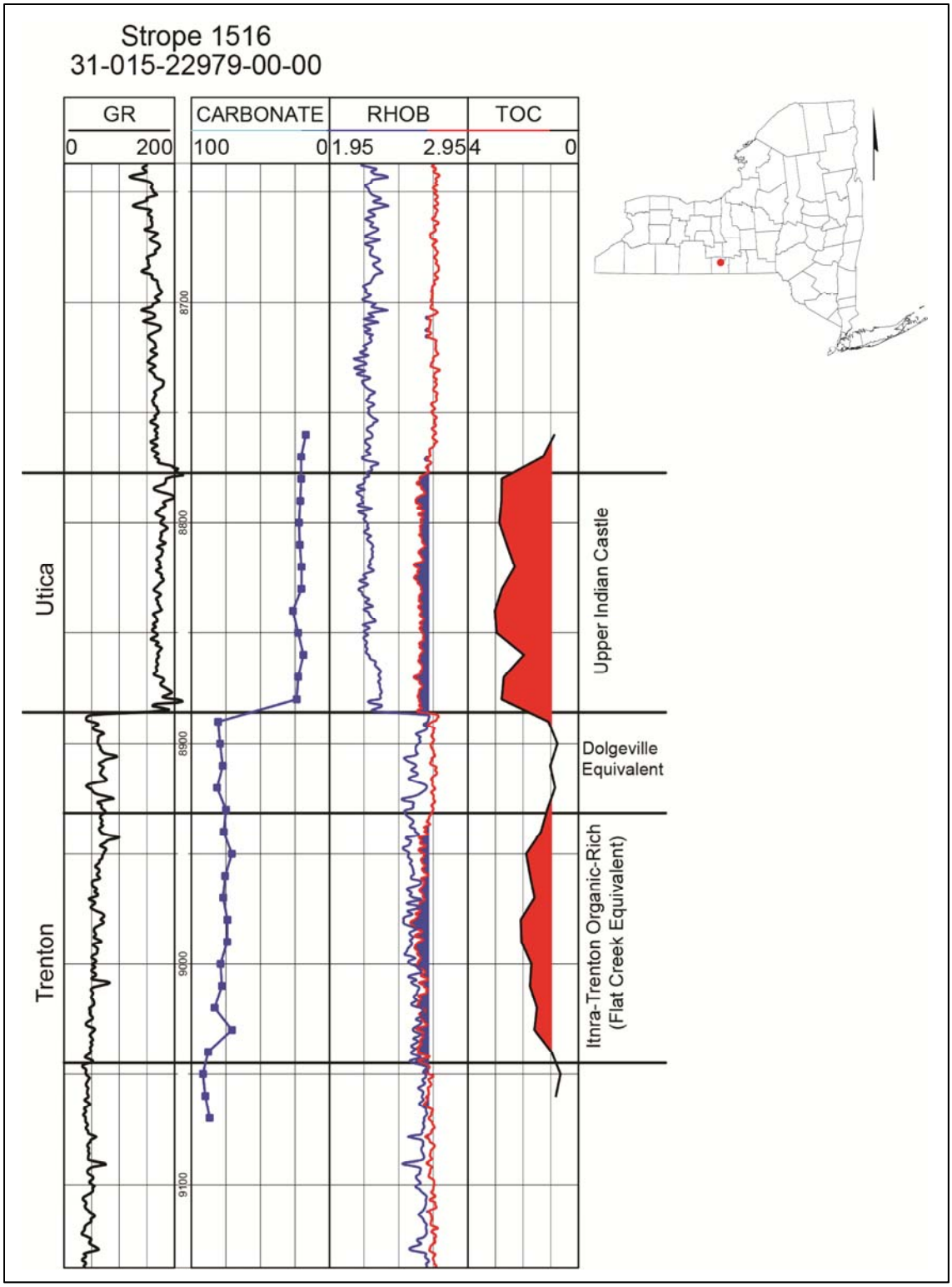

Figure 13. Gamma ray, carbonate content, formation density, and TOC for the Strope 1516 well in Chemung County, NY

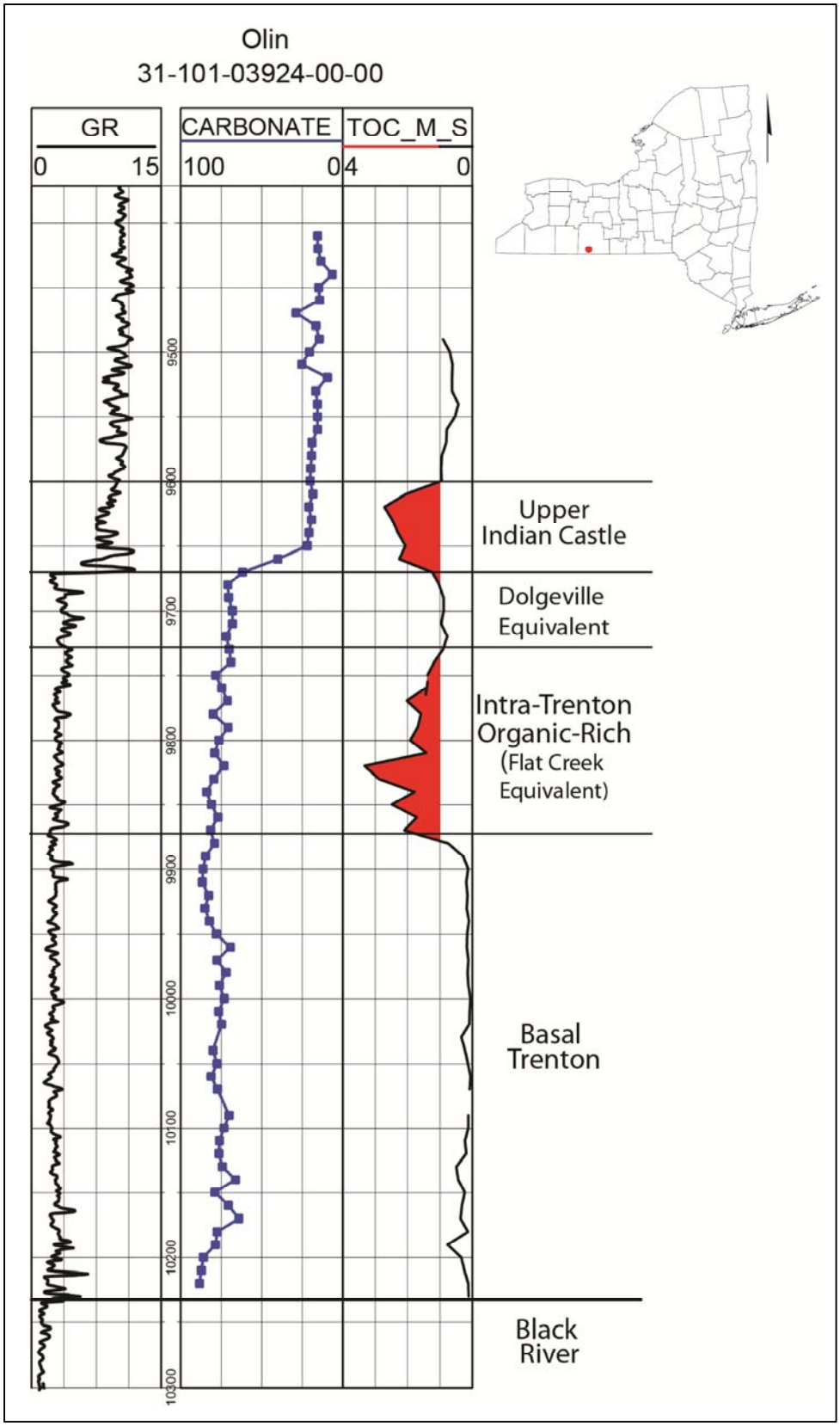

Figure 14. Gamma ray, carbonate content, and TOC for the Olin well in Steuben County, NY

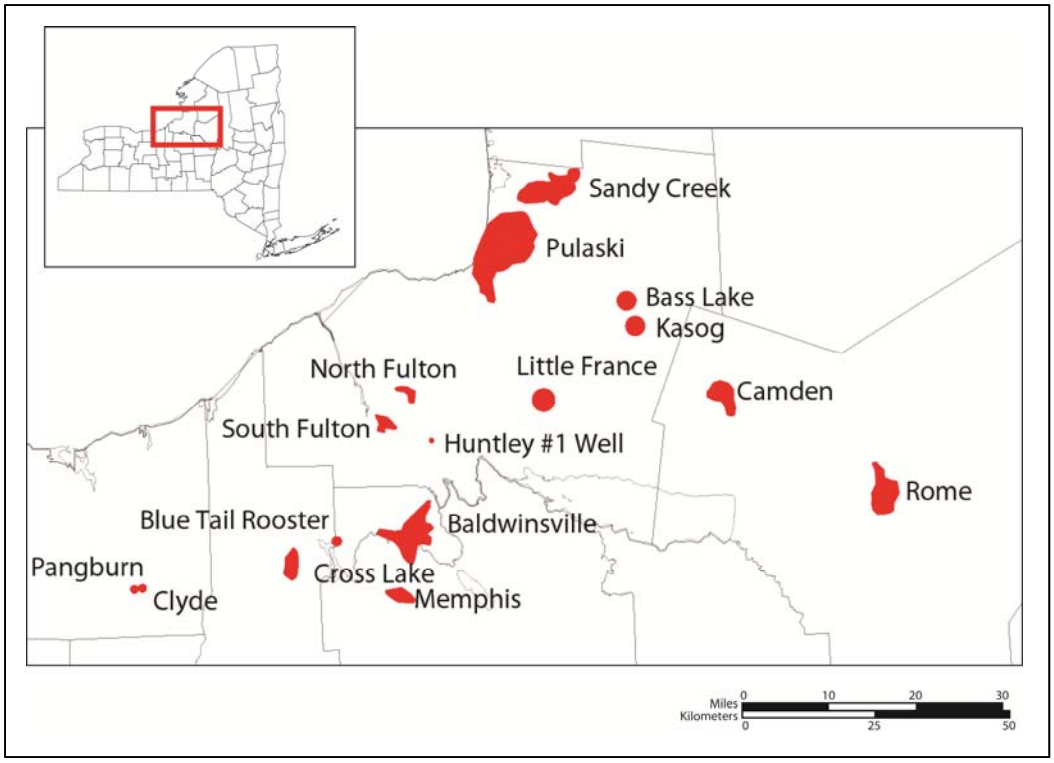

Figure 15. Trenton Limestone natural gas fields in north-central NY

Figure 16 shows the total thickness of organic-rich strata in the Utica Shale including all formations, but excluding the intra-Trenton play. Exploratory drilling will likely target different intervals in different parts of the state. The Flat Creek Shale has the thickest accumulation of organic-rich material to the southeast in Delaware, Otsego and Broome Counties (Figure 17). The Lower Indian Castle shale is the most organic-rich part of the section to the northeast near southern Herkimer County (Figure 18).

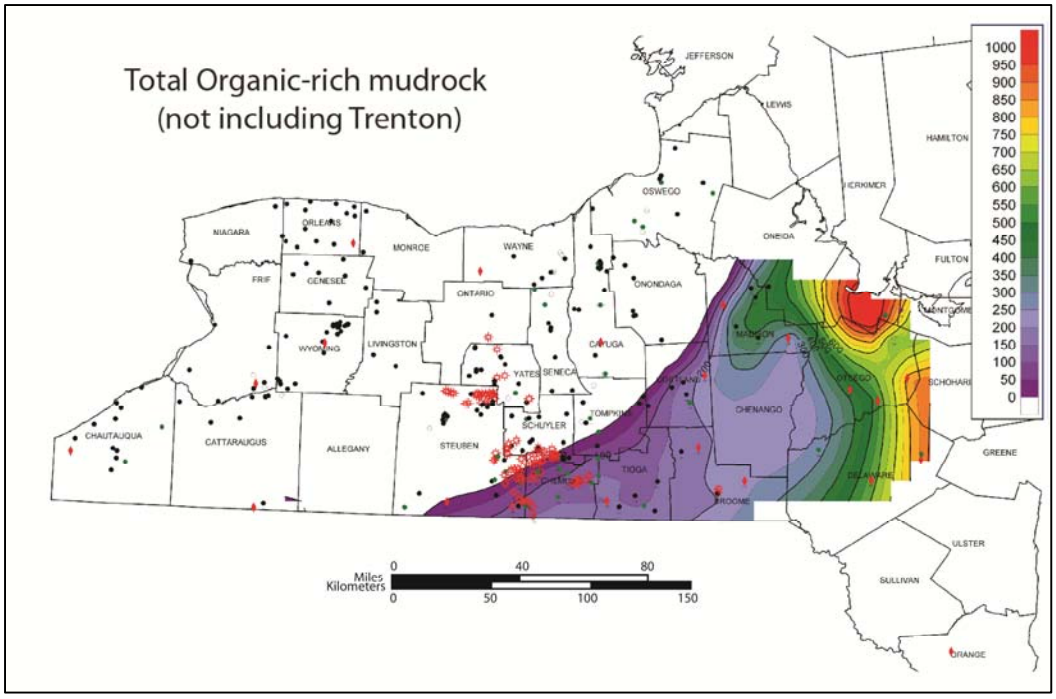

Figure 16. Approximate total thickness in feet of organic-rich shale in the Utica shale of New York

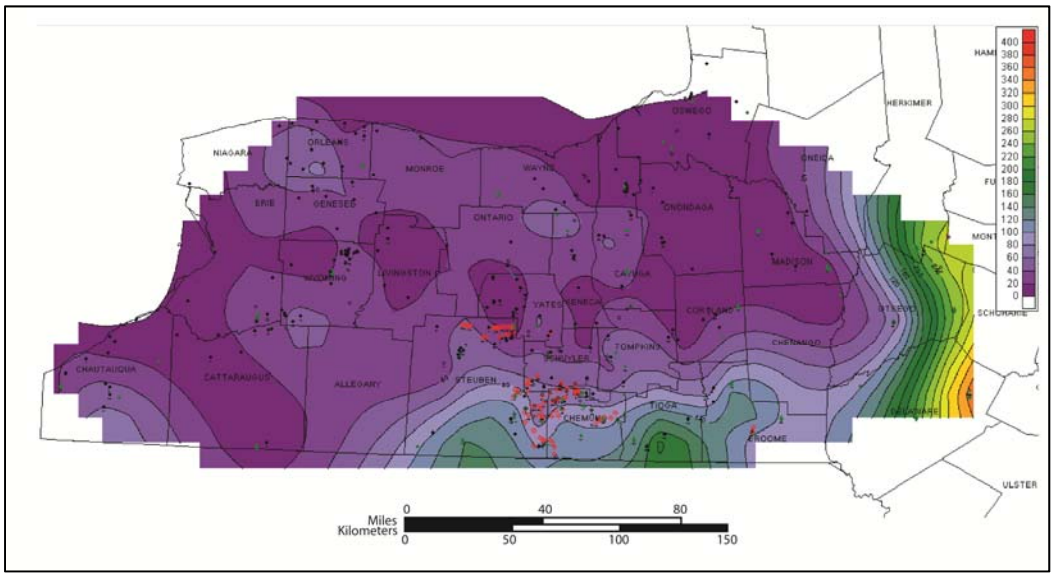

Figure 17. Thickness in feet of Flat Creek to Dolgeville interval (no Indian Castle) and its equivalents within the Trenton Group with density <2.65 g/cc

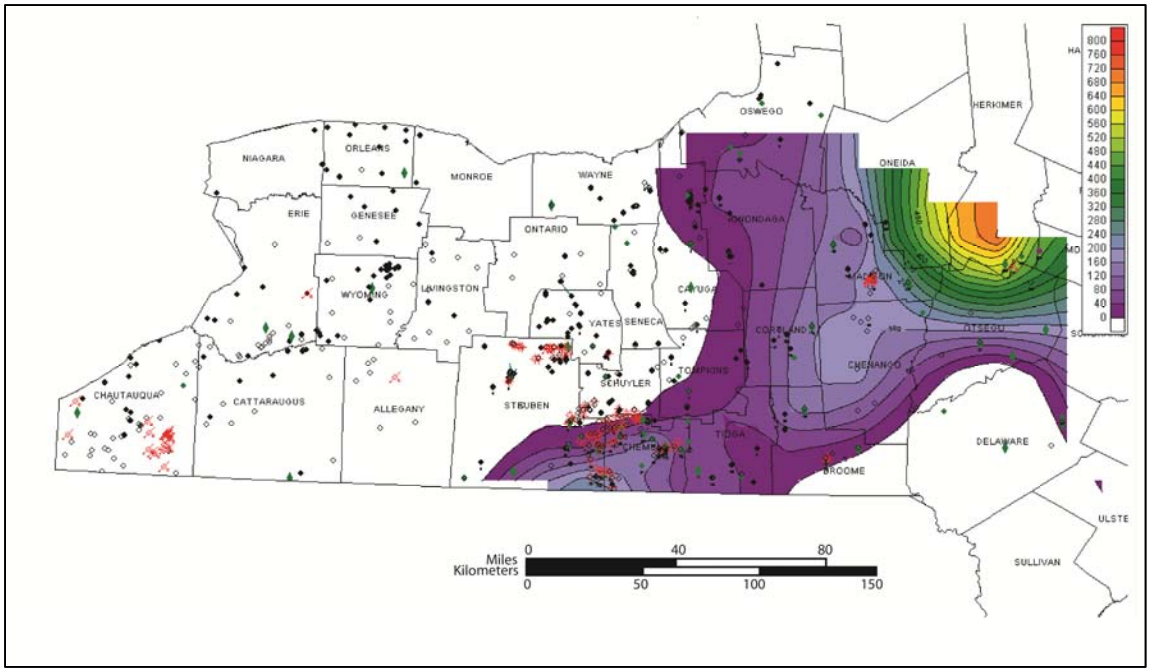

Figure 18. Thickness in feet of Indian Castle Shale <2.65 g/cc (roughly >1%TOC) in feet

There is a strong link between density and TOC. In carbonates, calcareous shales, and shales the grain density, or density of the rock with no porosity, is about 2.71 g/cc. Values of 1% TOC seem to line up fairly consistently with a density of 2.65 g/cc. Values of 2% TOC line up closely with values of around 2.60 g/cc. To illustrate this relationship, the density logs in the displays presented here, are shaded blue where they are less than 2.65 g/cc which roughly equals 1% TOC. Sonic porosity and resistivity logs are also used to identify pay zones in shales, but these logs are rare in the eastern part of New York where the Utica is most organic-rich.

4.5 WELL LOG CORRELATION

The Utica is a difficult formation to correlate in the subsurface for three main reasons. The first is that there is syndepositional structural movement that causes dramatic thickening and thinning of time-equivalent strata over short distances. The second is that some of the Utica is time-equivalent to the Trenton Limestone and some is younger than the Trenton. The third reason correlation is difficult is the occurrence of unconformities where significant sections are missing in certain areas.

When trying to correlate the Utica, identifying the disconformities is a good place to start. The Thruway Disconformity was first identified along the NYS Thruway and cuts down progressively lower into the stratigraphy from west to east (Baird and Brett, 2002). It caps the Hillier Limestone in the northwest, the Steuben Limestone Member of the Trenton Group in the central part of the state, and then caps the underlying shaly limestone of the Rust and Dolgeville Formations farther east. There is a change to the east

where the section becomes conformable and there is a gradual change from the Dolgeville Formation upward into the Lower Indian Castle. Moving westward, the Thruway Disconformity is overlain by progressively younger strata. It is overlain in the east by the Lower Indian Castle, and then farther west by the Upper Indian Castle. The Thruway Disconformity, therefore, caps progressively older strata moving from west to east and is then overlain by progressively younger strata moving from east to west. Some of the older parts of the Lower Indian Castle Formation that overlie the unconformity may be time-equivalent to younger parts of the Trenton Limestone or Hillier Formation that underlie the unconformity.

In the part of the basin where the organic-rich Utica is found, the Thruway Disconformity is very obvious on logs because it is a sharp surface that has carbonates with low gamma ray values below and shale with a higher gamma ray values above (Figure 19). Once this pick has been made, the Indian Castle is above and the Trenton or Dolgeville Formations must be below the surface. The Flat Creek Shale underlies the Dolgeville which should not be more than 100 feet thick.

The Thruway Disconformity dies out to the east where the section is more conformable (Figure 4). Figure 19 shows a cross section that has wells with the Thruway Disconformity to the west and conformable wells to the east. Figure 20 shows a map of the wells where the Thruway Disconformity is present in New York. Most wells have it with the exception of some to the southeast and some in the far northwestern part of the State where there is an additional formation called the Hillier Limestone that overlies the Trenton. Figure 21 shows the thickness of the Steuben Limestone which is the uppermost part of the Trenton Group. It is completely eroded by the Thruway Disconformity in the southeastern part of the basin along a very linear trend.

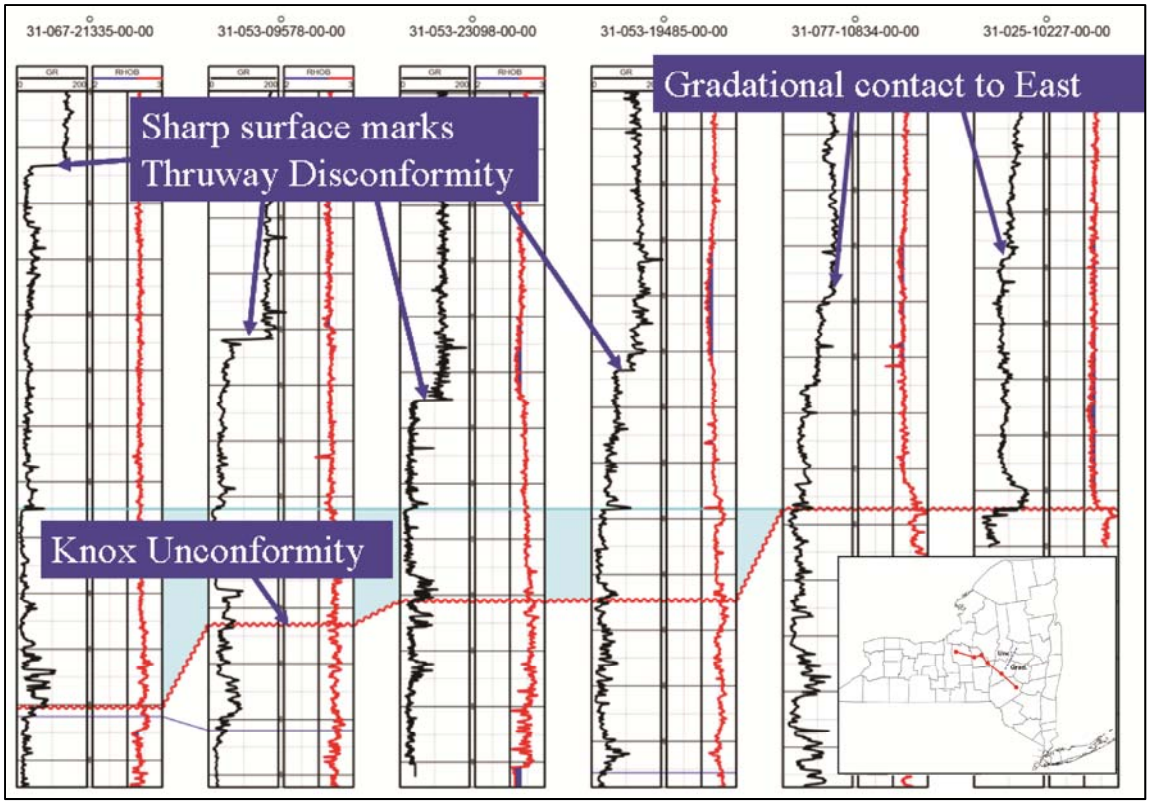

Figure 19. Northwest to southeast cross-section of well logs showing the Thruway and Knox Unconformities

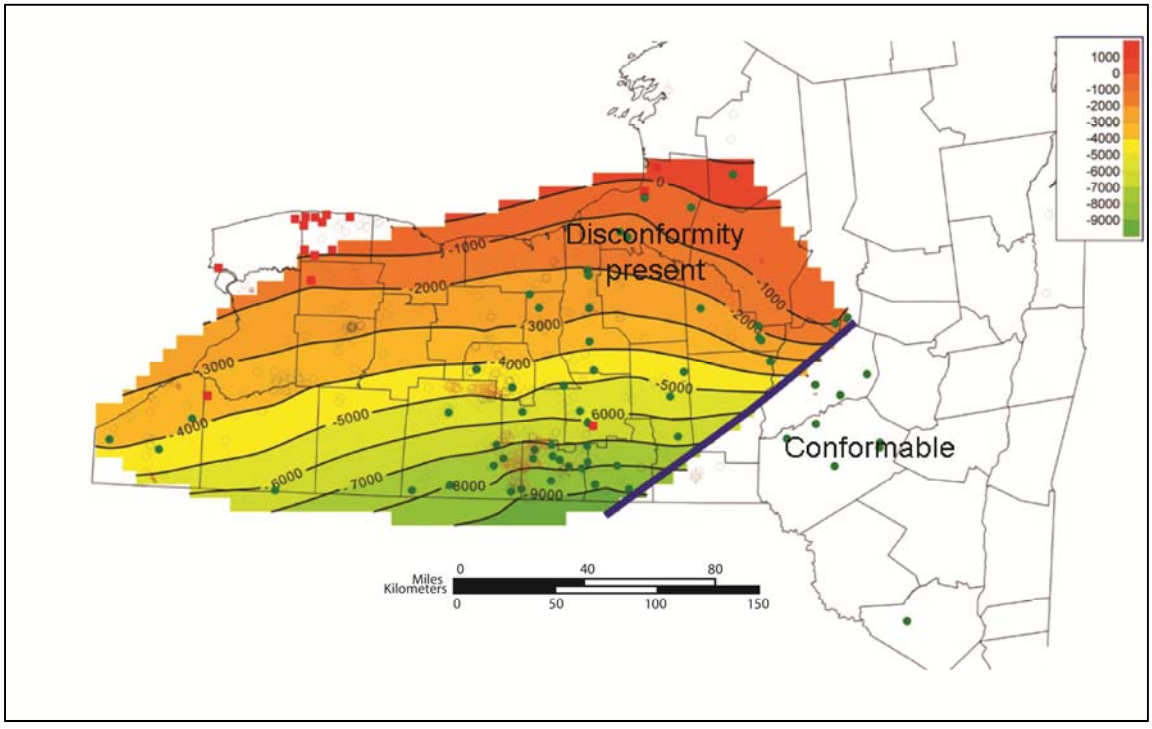

Figure 20. Contour map of depth in feet to the Thruway Disconformity where present

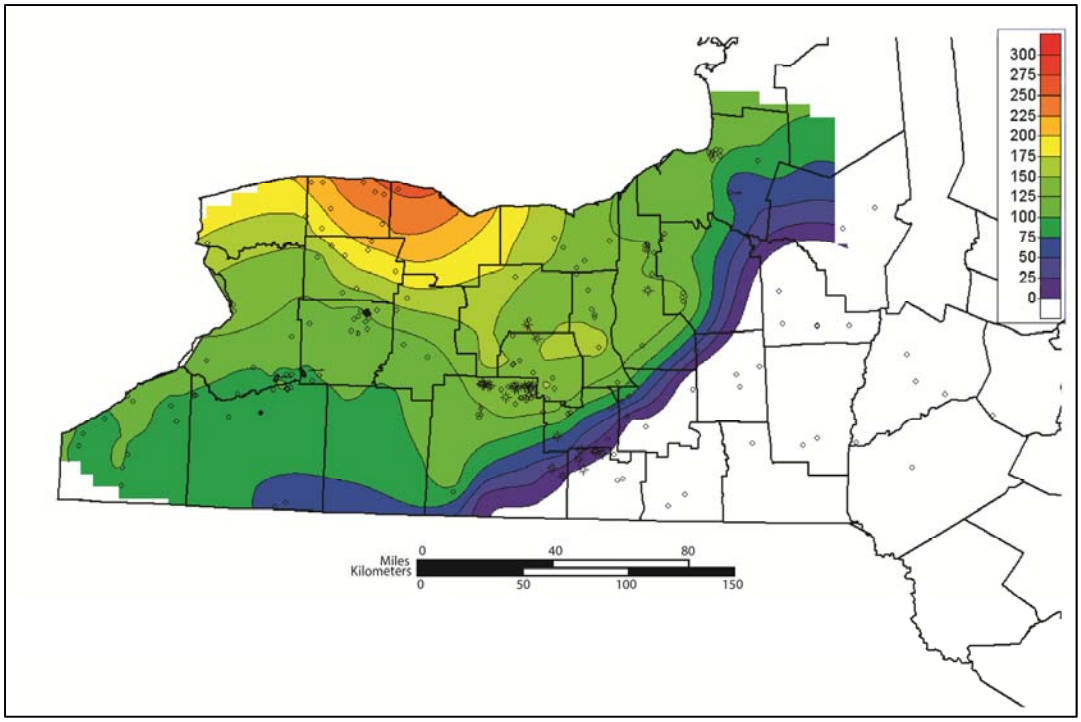

Figure 21. Isopach map of thickness in feet of Steuben Limestone

There is also a disconformity that underlies the Utica in the eastern part of the study area that plays a role in correlation. The Canajoharie Arch is a NNE trending positive feature that extended from the outcrop belt near Canajoharie all the way to the Pennsylvania border. The arch was emergent during Black River and basal Trenton time. Figure 4 shows that the Napanee, Kings Falls and Sugar River Formations are present in the west, but absent in the east. In many places this unconformity sits directly on the Beekmantown Group and is coincident with the global Knox Unconformity. In these cases the organic-rich Flat Creek Formation of the Utica Group commonly immediately overlies the unconformity.

Figure 22 shows a correlation of the Black River, Trenton and Utica Formations from west to east across southern NY. It shows the transition from the Trenton Limestone into the Flat Creek and Dolgeville Formations, the Thruway Disconformity and the overlying Indian Castle Shale. Dark gray shading is used to indicate organic-rich shale. There is a tectonic high that separates much of the organic-rich shale deposition to the east from the limestone deposition to the west during Trenton and Flat Creek time.

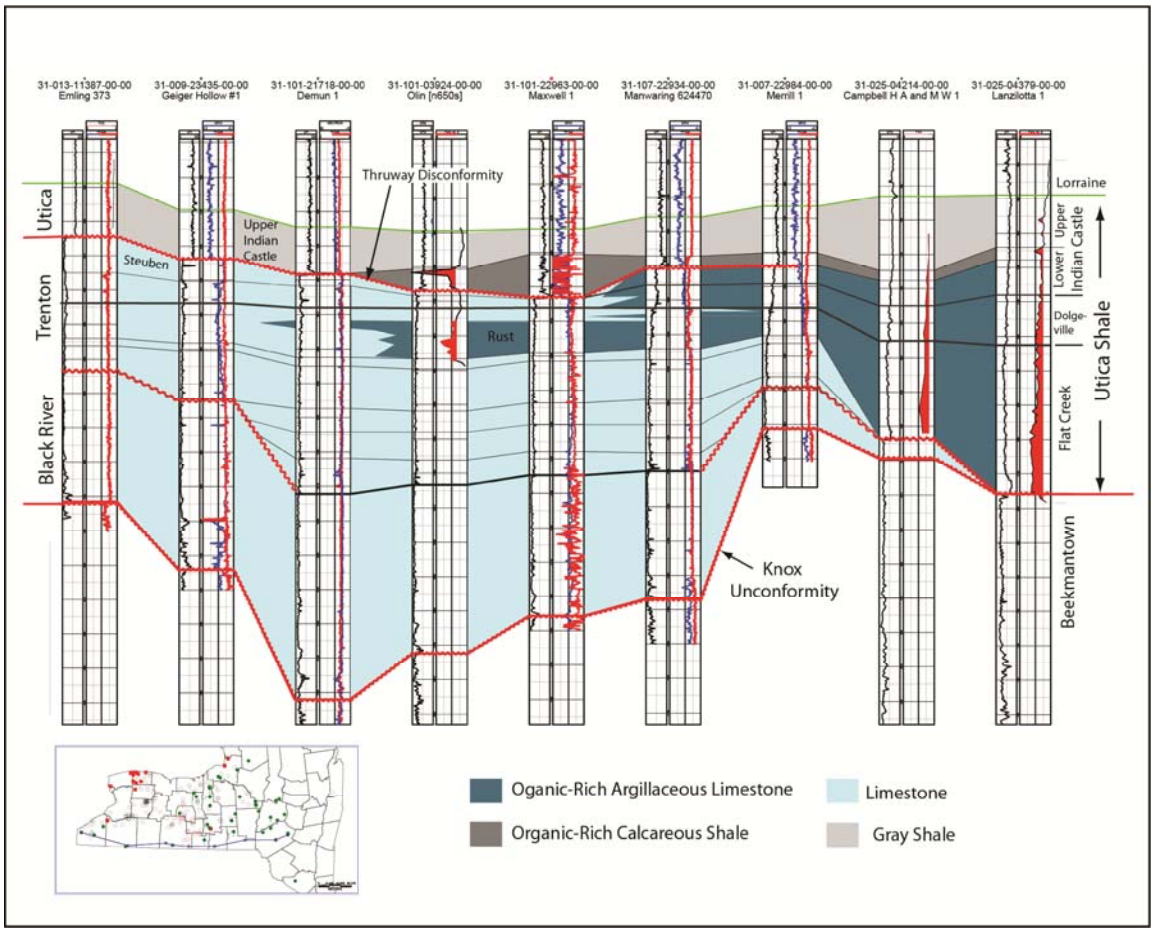

Figure 22. West to east cross section of Black River, Trenton, and Utica Groups

A thick accumulation of organic-rich strata in the Lower Indian Castle occurs near the outcrop belt in the Little Falls Graben (see Figure 5). Figure 23 shows the subsurface expression of this feature. The organic-rich section thickens from about 200 feet thick on the west flank to more than 900 feet in the center of the graben. Similar features could occur elsewhere in the subsurface.

Figure 24 is a NW-SE cross section that extends from near Syracuse to Orange County, NY. This figure shows stratigraphy similar to the one presented in Figure 22, but also shows a major fault to the east with 5,500 feet of turbidites and other siliciclastics on the downthrown side. This turbidite succession is called the Normanskill or Schenectady Formation in New York and is time-equivalent to the Martinsburg Formation farther south. This succession has very low organic content. It is primarily on the upthrown (west) side of this fault that organic-rich shale can be found.

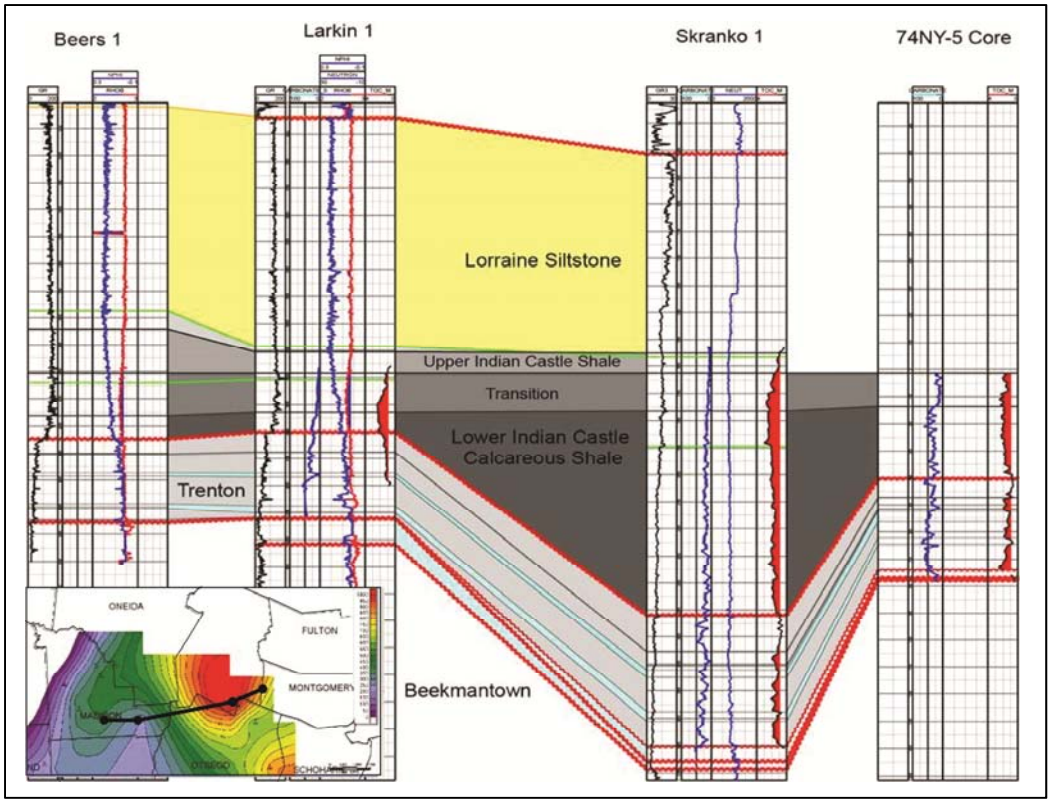

Figure 23. West to east cross section across the Little Falls Graven in the subsurface

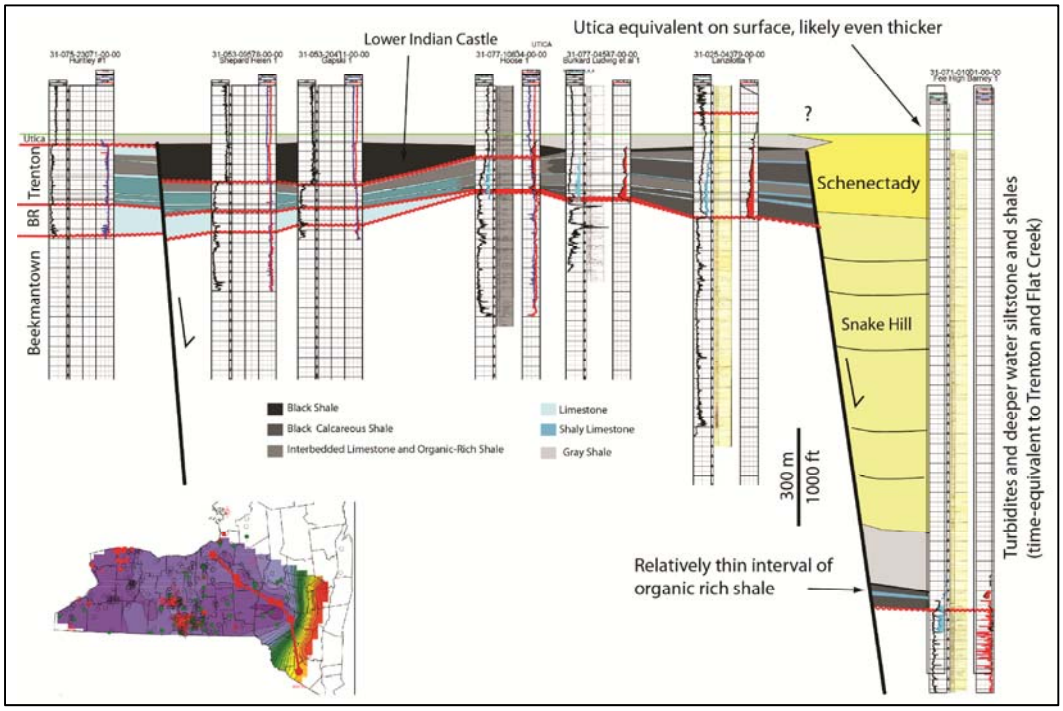

Figure 24. Northwest to Southeast cross section with extensional fault and downdropped block to the east with 5,500 feet of Utica-aged siliciclastics

Figure 25 is an isopach thickness map of the Trenton-Utica interval. The Trenton and Utica together are about 800 feet thick on most of the upthrown side of the fault, but thicken to more than 6,000 feet on the downthrown side of the fault. Deposition of the organic-rich shale occurred in the area immediately west of the fault on the upthrown side.

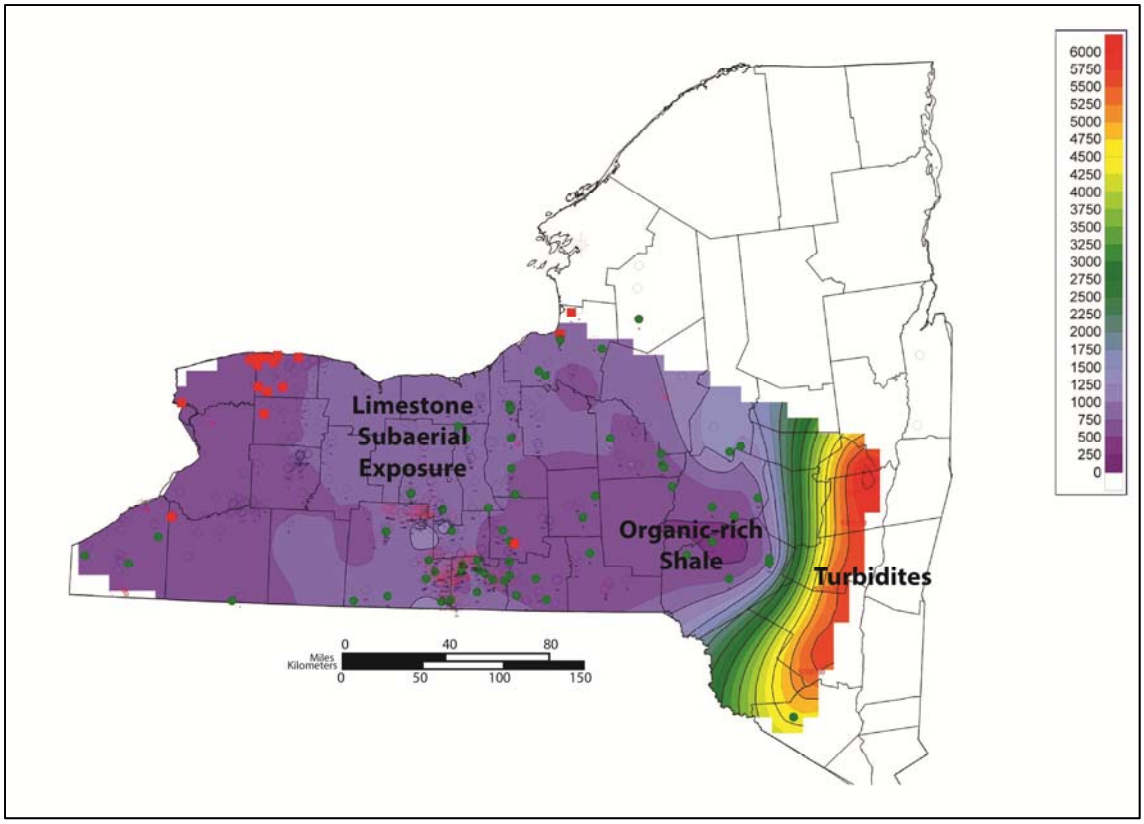

Figure 25. Isopach map with thickness in feet of the Trenton-Utica Interval

Section 5
DISCUSSION

As discussed in Section 1, the Utica Shale is composed of three formations: the Indian Castle, Dolgeville, and Flat Creek. The organic-rich Flat Creek and Dolgeville Formations are time-equivalent to the Trenton Limestone which was deposited farther west. The Lower Indian Castle Formation is organic-rich while the Upper Indian Castle is clay-rich and low in organic-content The organic-rich Indian Castle formed in the eastern portion of the study area while a disconformity formed to the west. In some eastern wells, the organic-rich Utica (>1%TOC) is over 1,000 feet thick. This thins to the west and in western New York the Utica Shale is entirely composed of the clay-rich Upper Indian Castle and has little or no potential for gas production.

5.1 DEPOSITIONAL ENVIRONMENT

Figure 26 is a revision of Figure 2 and shows a schematic depositional environment for the organic-rich Utica Shale and time equivalent carbonates and siliciclastics. The figure shows carbonates of the Trenton Group forming to the west and a major down-dropped section to the east (probably composed of multiple faults) into which turbidites sourced from the mountains are deposited. Sands and silts are prevented from being deposited farther west because gravity keeps them on the downthrown side of the fault and in the deepest part of the basin. Organic-rich shale facies were deposited on the upthrown side of the fault system, to the present-day east of the carbonates and west of the turbidites. The organic-rich Utica facies were probably deposited in a seasonally dysoxic, murky, relatively shallow marine environment with possible tidal and storm influence. Murkiness came from suspended clay sourced from the mountains to the present day east. The murkiness likely suppressed carbonate deposition due to lack of light and the suspended clay settled and was deposited over time.

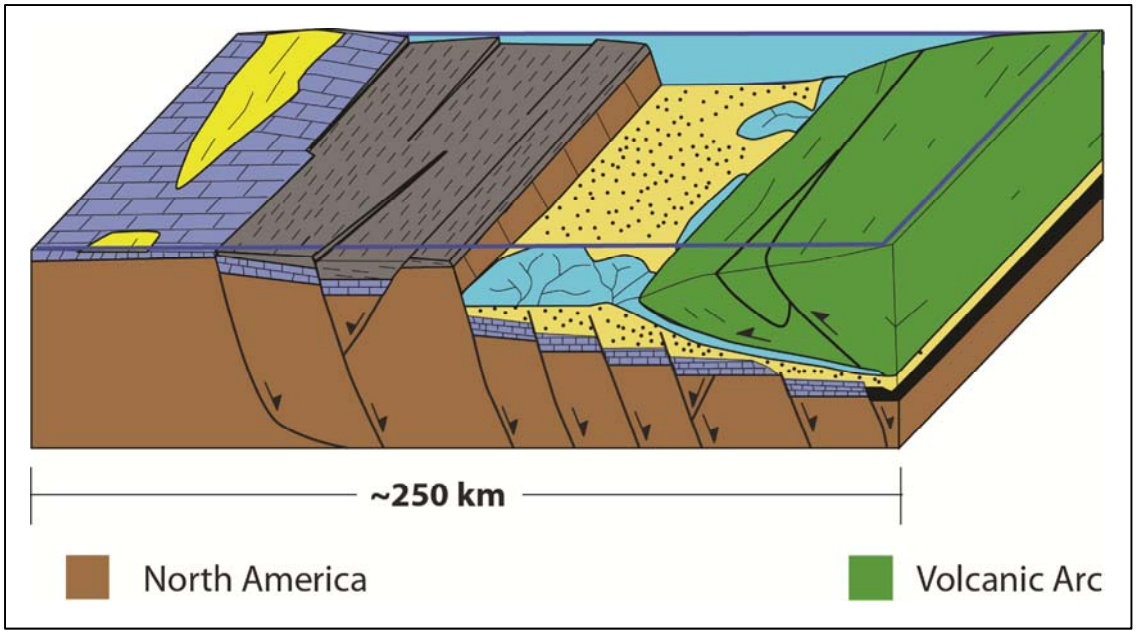

Figure 26. Schematic depositional environment for the Trenton and Utica Formations during Taconic Orogeny Source: modified from Figure 2, Bradley and Kidd, 1991

The water depth probably increased slightly from the area of carbonate deposition to the area of organic-rich shale deposition but not by more than 100 feet (30 meters). The true deep water facies were on the downthrown side the fault system (organic-poor turbidites and gray organic-poor shales). There may have been some organic-matter deposited in that part of the basin, but it was diluted by all of the other sediment. The area where organic-rich shale was deposited had been a tectonic high prior to deposition, so it did not start as an area of deeper water deposition. The thickness of the post-organic-rich shale facies is no thicker in the area of Trenton than in the area of Utica deposition suggesting that there was no unfilled relief. This alone tells us that the water depth of the organic-rich shale deposition could not have been much greater than in the area of carbonate deposition.

Syndepositional extensional faulting caused some parts of the organic-rich deposition area to subside faster than others. Detailed work on the Little Falls Graben fill (Baird and Brett, 2002) shows that the graben was probably full or nearly full during deposition. This can be inferred by the fact that the intervals between bentonites thicken proportionally into the graben from the flanks of the structural feature. Relief on the seafloor would have been relatively minor as much greater thicknesses of strata were deposited in the graben, keeping it full.

Organic-rich shales may be as likely, or more likely, to form in shallow marine (10-50m) seasonally dysoxic or anoxic environments as they are in deeper permanently anoxic environments (Tyson and Pearson, 1991). Seasonal anoxia can occur when swelling rivers are laden with an abundance of nutrients during the spring. This leads to algal blooms downstream where the rivers meet the sea. Algal blooms lead

to eutrophication where decomposition of dying algae causes a depletion of oxygen. During the summer and early fall, a thermocline may develop that helps maintain a thin zone of anoxia near the seafloor. This zone of anoxia only needs to be a few millimeters thick to preserve the organic matter. During the late fall and winter, the thermocline may cease and the entire water column may become fully oxygenated with the pycnocline at or below the sediment water interface. Burrowers and organisms that can tolerate stressed conditions might move into the environment during these periods. Storms may rip up years' worth of organic-rich sediments and bring buried nutrients back to the surface. However, over time, enough organic matter could be buried to produce an organic-rich shale. Broadly distributed organic-rich shales deposited in vast epeiric seas such as the Utica and Marcellus are much more likely to have formed in relatively shallow, seasonally anoxic/dysoxic conditions than in deep, permanently anoxic conditions.

5.2 CARBONATE CONTENT

The amount of carbonate (typically $CaCO_3$) in a shale has a direct relationship on now brittle the formation is. Generally speaking, brittle shales respond better to hydraulic fracturing. This can be an important factor when considering the production potential of an organic-rich shale. As mentioned in Section 4.3, the organic-rich shales of the Flat Creek have relatively high carbonate compared to that of the Indian Castle, though all units have some intervals of high carbonate content (Appendix A). This would be considered a positive characteristic were the Flat Creek of New York to be drilled and hydraulically fractured.

In addition to its effect on hydraulic fracturing, carbonate content has proven to be a useful tool for stratigraphic correlation across the study area. For example, in the eastern part of the state where the Thruway Disconformity is absent and the contact between Lower Indian Castle and Dolgeville is conformable, the increase in carbonate in the Dolgeville is a clear indicator of the contact between these two formations

5.3 TOTAL ORGANIC CARBON

In a broader context, one of the big questions regarding hydrocarbon production from the Utica in New York is if the TOC content and organic porosity are high enough. Most of the organic-rich strata have 1 to 3 wt% TOC. In contrast, the Marcellus Shale commonly has values three times higher, with values in the Union Springs commonly being 8 to 10 wt% TOC. The Utica is supermature in most parts of New York and TOC values may have been higher at lower maturity levels, but there are very few successful shale plays with TOC in the 1 to 3 wt% range where no other form of porosity is present.

Recent papers have shown that organic porosity in supermature shales should roughly equal 80 to 100% of the TOC value (Schieber, 2011). So, 1.0% TOC would equal 0.8% to 1.0% porosity. Values of 3.0% TOC

would equal 2.4% to 3.0% organic porosity. It may be that this is not enough to make a good shale gas reservoir, but most of the Utica has relatively low values and there appears to be little if any other matrix porosity.

5.4 THERMAL MATURITY

It has been suggested that there is an upper limit to thermal maturity at R_o values of approximately 3.2, and that above this level of maturity, a formation is much less likely to produce gas at economic rates. It has therefore been termed the "line of death." A vitrinite reflectance value of 3.2 is approximately equal to a CAI value of about 3.8, so anything above 3.8 may be considered over mature. This idea arose in the Marcellus Shale Play in Pennsylvania where there appears to be a "line of death" that separating the highly productive wells to the west from wells in the east that have not produced economically. Thus, the possibility of an upper limit of thermal maturity is a critical question for Utica potential in NY. If a CAI value of 4 or even 4.5 (R_o value of 4) is the cutoff, then most of the area in New York where the Utica is both organic-rich and reasonably thick is over mature.

It is important to note that high thermal maturity does not necessarily mean that all hydrocarbon has been burnt off. Thermal maturity is a measurement of kerogen quality. While some have speculated that thermal maturity may be the cause of uneconomical production in some areas, it is more likely that changes in facies, mineralogy, structure, or pressure are the cause. It should be pointed out here that the Utica does not appear to be overpressured in New York and has TOC values similar to or less than the TOC values in the Marcellus in areas of poor production. If a lack of overpressure or low TOC is the reason for lack of Marcellus production in eastern PA, then the Utica Shale in NY is also likely to have poor production.

5.5 DRILLING IN THE UTICA

It appears that most shale gas plays that use horizontal wells and hydraulic fracturing are only successful at depths of at least 3,000 feet and more typically at depths greater than 4,000 feet. This is for at least two reasons. There is a change in the stress field such that the principal compressive stress is horizontal at depths shallower than 2,500 feet. Below this depth the principal compressive stress changes from horizontal to vertical. Fractures generally form parallel to the principal compressive stress, so vertical fractures are more likely to form at depths greater than 2,500 feet, while horizontal or "pancake" fractures are more likely to form at depths less than 2,500 feet. The lack of vertical fractures at shallower depths would make it much harder to access the thick organic-rich Utica section with a horizontal well. Figure 27 shows the depth to the top of the organic-rich Utica where present and the top of the Trenton in areas where the organic-rich Utica is absent.

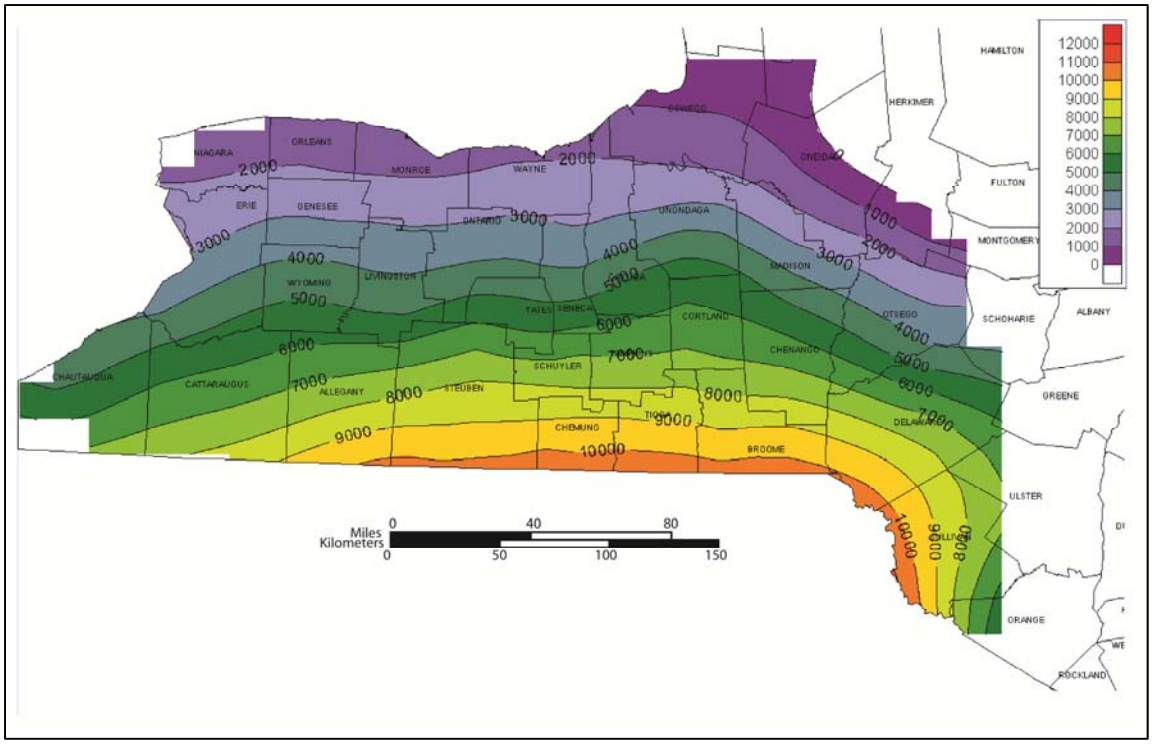

Figure 27. Contour map of depth in feet to top of organic-rich Utica where present, and top of Trenton where absent

More so than the stress field change, pressure is likely to be one of the key factors in whether or not a shale well is productive. Most of the successful shale plays are at least 4,000 feet deep and have some degree of overpressure. The Marcellus Shale in Pennsylvania is highly overpressured, meaning that the pressure of the gas in the formation is greater than hydrostatic pressure. In some of the more successful areas, the Marcellus has a pressure gradient much greater than hydrostatic with values as high as 0.8 psi/ft. That degree of overpressure helps to drive gas out of the formation. If the Utica is not overpressured, it may greatly diminish its chances of producing successfully. Unfortunately, we did not have access to pressure data for this study, however anecdotal reports suggest that the Utica is not overpressured in New York. This may be, in part, due to the lack of a confining unit above the Utica, and would explain the lack of gas shows in many wells that penetrate the Utica. Virtually every well drilled through the Marcellus has a gas show.

As mentioned earlier in this report, overpressure is known to occur in the time-equivalent Trenton Limestone. Tongues of organic-rich shale extend into the Trenton Limestone, and these units can be highly overpressured. A tight limestone unit at the top of the Trenton called the Steuben Limestone may be the seal that has enabled pressure to develop. This overpressure can be close to lithostatic and has been known to cause drilling problems and even blowouts.

5.6 FAIRWAY MAP

Figure 28 is a fairway map of the Utica Shale in New York. The map shows the area where the Utica Shale is at least 40 feet thick, 3,000 feet deep, and has TOC of at least 1%. It is about 5,000 square miles (13,000 km^2) which is a vast area. If the cutoff for productive Utica is at TOC values of greater than 3 wt%, then there is no fairway for Utica production in New York. Similarly, if the Utica must be overpressured to produce, as appears to be the case with the Marcellus, then from what we currently know, there may be no fairway for the Utica in New York. If there is a thermal maturity cutoff of 3.2, or even 4.0, then the fairway for the Utica would be very small, perhaps just around the outcrop belt in the north. But if TOC values of 1 to 3 wt% are sufficient, overpressure is not necessary, and there is no thermal maturity cutoff, then the Utica could be productive over a large area – much larger than the area where the Marcellus is likely to produce in NY.

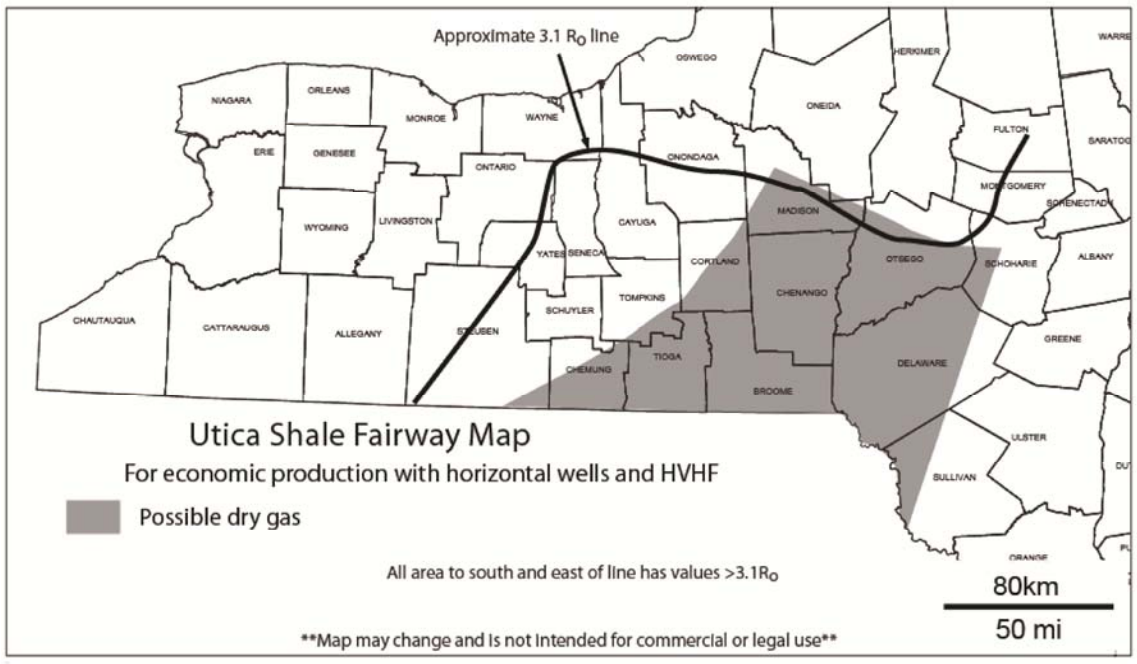

Figure 28. Fairway map for Utica Shale in New York State as defined in this study (possible means <50% chance of production)

5.7 RESOURCE ASSESSMENT

The USGS published a resource assessment of the Utica Shale in the northern Appalachian Basin (Kirschbaum et al., 2012). The fairway map presented in their report shows an area of about 2,800 square miles in New York (Figure 29). The map presented in this report shows roughly 5,000 square miles in the state where there may be Utica potential. The USGS estimated a recoverable resource of 20.6 to 59.4 TCF with a mean of 37.2 TCF in an area that is about 50,000 square miles. Simple math would give the 5,000

square mile area in New York a range of 2 to 6 TCF with a mean of 3.72 TCF. If the smaller USGS fairway map and its 2,800 square mile area is used, then the range would be 1.1 to 3.2 TCF with a mean of approximately 2 TCF. Regardless of whether the larger or smaller area is used, these numbers are less than 1/10 of the volume anticipated to be produced from the Marcellus of New York.

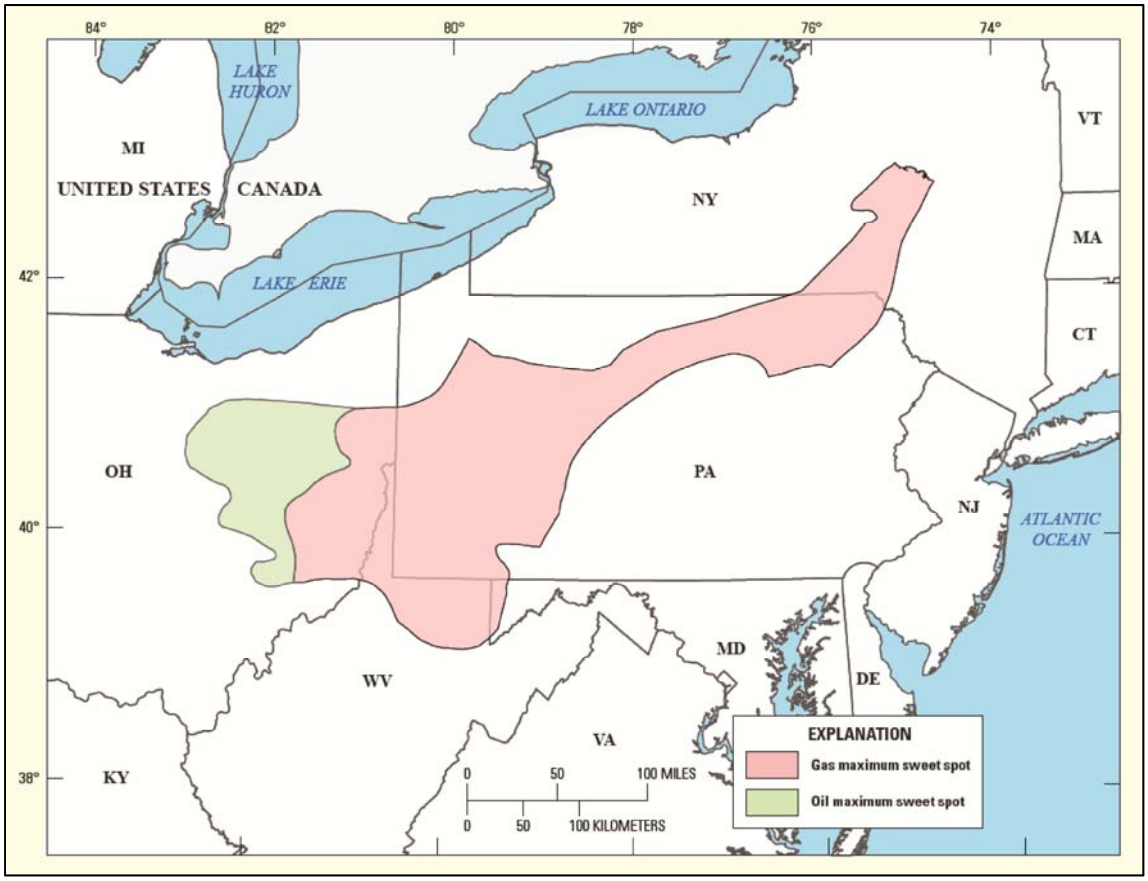

Figure 29. Fairway map for potential oil and gas production from the USGS report on the Utica Shale and equivalents Source: Kirschbaum et al., 2012

Section 6
CARBON SEQUESTRATION POTENTIAL

6.1 SEQUESTRATION IN SHALE

Sequestration of carbon dioxide from large stationary sources into porous and permeable rock formations is one of the techniques being developed and used around the world to help mitigate greenhouse gas emissions. Though shale is typically evaluated as a sealing unit used to prevent the escape of CO_2 from sandstone or carbonate reservoirs, organic-rich shales may also have value as potential storage units themselves. As discussed in section 5.3, TOC measurements can be used to approximate the amount of organic porosity in a shale. Based on measurements from this study, sections of the Utica may have 2 to 4% porosity. This would generally be considered the low end of the range of porosity needed to successfully sequester CO_2, and would greatly depend on other characteristics such as permeability.

6.2 SEQUESTRATION CAPACITY FROM PRODUCTION

Most permeability in the productive areas of the Utica is created via hydraulic fracturing, therefore sequestered CO_2 is not likely to migrate far beyond the stimulated area. One method of estimating the storage capacity of the Utica uses the volume of methane produced to calculate the amount of space that may be occupied by sequestered CO_2. First, the 3.7 Tcf of natural gas production potential from section 5.7 must be converted to reservoir barrels using a gas formation volume factor. This requires values for reservoir temperature and reservoir pressure. Both of these properties change a great deal across the Utica fairway as the formation depth ranges from approximately 2,000 feet in the north to 10,000 feet along the Pennsylvania border. Formation pressure data is difficult to find for the Utica, therefore a graph of hydrostatic pressure published by Schlumberger Oilfield Services was used to approximate a pressure of 2,900 psia at 6,700 feet (average depth of the Utica wells sampled) (Figure 30). Bottom hole temperatures recorded in well log headers were used to calculate an average formation temperature of 130ºF at the average depth of 6,700 feet. By entering these values into a gas formation volume factor calculator (http://www.ioilfield.com/units_correl/g_fvf.html), we find this factor is .0010 RB/scf. Therefore, 3.7 TCF of natural gas equals roughly 3.7 billion reservoir barrels. Assuming 9 reservoir barrels per metric ton of CO_2, this equals 0.33 Gt of CO_2 storage capacity. To put this into perspective, the EPA estimated New York's CO_2 output for 2012 to be 0.163 Gt (http://epa.gov/statelocalclimate/documents/pdf/CO2FFC_2012.pdf).

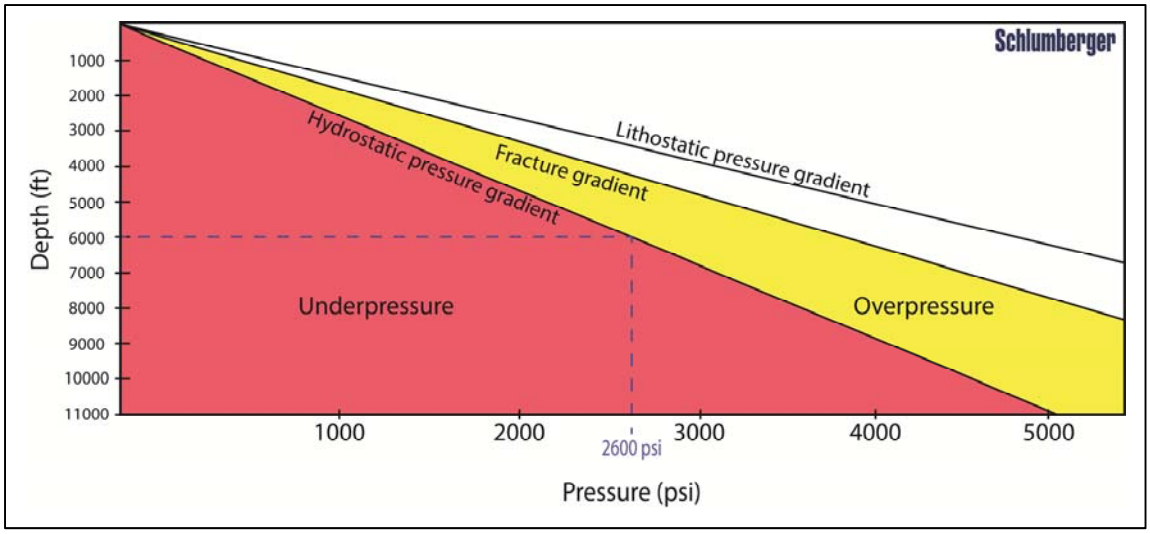

Figure 30. Graph of hydrostatic pressure gradient Source: modified from Schlumberger Oilfield Glossary

6.3 SEQUESTRATION CAPACITY BY PORE VOLUME

Of the 61 wells analyzed in this study, 28 lie within the fairway outlined in Figure 28. To calculate CO_2 storage capacity from pore volume, a spreadsheet of these 28 wells was created with depth of the Utica, mean TOC value, and feet of TOC greater than 1%. Pressure values were calculated using a hydrostatic gradient of 0.44 psi/ft., and temperatures were acquired from well log data. The density of CO_2 under reservoir conditions was determined using a density calculator from the National Institute of Standards and Technology (NIST) (webbook.nist.gov/chemistry/fluid/). As stated in section 5.3, porosity in an organic-rich shale is roughly equal to 80 to 100% of the TOC. We have elected to use the lower end of this range for our capacity calculation. The equation C=(porosity)*(thickness)*(ρ_{CO2})*(*E*), where ρ_{CO2} is the density of CO_2 in pounds per cubic foot and *E* is an efficiency factor, was used to calculate capacity in pounds per cubic foot for each well. These capacities were then converted to tons per acre and averaged (Table 2). The average capacity per acre was then multiplied by the 3,212,370 acre (13,000km^2) fairway area. These calculations indicate that approximately 0.27 Gt of CO_2 could be sequestered in the Utica fairway. It is important to note that this estimate is based on the unrealistic assumption that the entire Utica fairway will be accessible for sequestration.

WELL API	TOP of Utica	BASE of Utica	MIDDLE of Utica	MEAN TOC (wt%)	FEET of TOC > 1%	Pressure (psi)	Temp (°F)	Density of CO2 (lbm/ft³)	Porosity	Efficiency Factor (4%)	CO2 Capacity (lbm/ft³)	CO2 Capacity (lbm/acre)	CO2 Capacity (tons/acre)
EQUATION	From Log	From Log	=(B2+C2)/2	Measured	Measured	=D2/2.29	From Log	from website	=(0.8*E2)/100	Standard	=W2*U2*X2	=Y2*43560	=Z2/2200
31065039280000	2826	3226	3026	1.89	350.5	1322	90	44.8	0.015	0.04	9.50	413944.25	188.16
31077040550000	2459	4247	3353	1.63	732.0	1464	95	44.7	0.013	0.04	17.11	745475.73	338.85
31053095780000	3433	3781	3607	1.10	251.6	1575	95	46.2	0.009	0.04	4.10	178430.15	81.10
31053040320000	3579	3772	3676	2.02	164.0	1605	96	46.2	0.016	0.04	4.90	213307.72	96.96
31053194850000	3801	4003	3902	1.99	142.3	1704	97	46.9	0.016	0.04	4.25	184972.98	84.08
31077045470000	3698	4308	4003	1.53	255.0	1748	97	47.3	0.012	0.04	5.91	257228.60	116.92
31077108340000	4013	4508	4261	1.49	450.0	1861	98	48.0	0.012	0.04	10.33	449769.36	204.44
31071010010000	4450	4681	4566	1.54	80.0	1994	100	48.5	0.012	0.04	1.92	83542.08	37.97
31101217030000	5353	5772	5563	0.38	0.0	2429	104	50.2	0.003	0.04	0.00	0.00	0.00
31039039040000	5546	6028	5787	1.25	350.0	2527	108	49.9	0.010	0.04	6.99	304473.27	138.40
31023215000000	6022	6177	6099	1.81	152.7	2664	110	50.2	0.014	0.04	4.43	193055.31	87.75
31025043790000	5917	6770	6344	1.67	725.4	2770	115	49.7	0.013	0.04	19.30	840666.00	382.12
31023047140000	6661	6895	6778	1.42	149.8	2960	123	49.0	0.011	0.04	3.32	144834.02	65.83
31025043640000	6832	7393	7112	0.61	70.0	3106	136	47.3	0.005	0.04	0.65	28247.75	12.84
31109044670000	7136	7350	7243	1.01	120.0	3163	136	47.6	0.008	0.04	1.84	80248.12	36.48
31007050870000	7414	7540	7477	0.61	4.7	3265	140	47.4	0.005	0.04	0.04	1869.27	0.85
31097229350000	7135	7921	7528	0.68	10.0	3287	140	47.5	0.005	0.04	0.10	4492.10	2.04
31109039730000	7453	7763	7608	1.46	10.0	3322	142	47.3	0.012	0.04	0.22	9626.13	4.38
31025042140000	7410	8240	7825	1.18	495.4	3417	142	47.8	0.009	0.04	8.96	390272.71	177.40
31015232280000	7894	8660	8277	2.09	10.0	3614	145	48.2	0.017	0.04	0.32	14042.07	6.38
31015004430000	8067	8901	8484	3.19	10.0	3705	150	47.8	0.026	0.04	0.49	21254.77	9.66
31101230550000	8448	9182	8815	1.14	67.5	3849	153	47.9	0.009	0.04	1.18	51394.60	23.36
31015229790000	8763	8885	8824	2.41	122.1	3853	153	47.9	0.019	0.04	4.51	196299.59	89.23
31015103350000	8960	9329	9144	2.00	80.0	3993	160	47.4	0.016	0.04	2.42	105550.51	47.98
31101231900000	9140	9235	9188	0.36	0.0	4012	160	47.5	0.003	0.04	0.00	0.00	0.00
31107239270000	8982	9652	9317	0.41	0.0	4068	162	47.4	0.003	0.04	0.00	0.00	0.00
31101039240000	9436	9674	9555	1.20	48.7	4172	166	47.3	0.010	0.04	0.89	38681.54	17.58
31107231920000	10313	10577	10445	1.73	190.0	4561	173	47.8	0.014	0.04	5.02	218552.48	99.34
												Average Capacity (tons/acre)	83.93
												Capacity for NY Utica Fairway (gigatons)	0.27

Table 2. CO2 capacity calculations based on TOC pore volume

6.4 SEQUESTRATION WITH ADSORPTION

Calculating the Utica's storage capacity based on methane production alone may give a rough approximation of the amount of CO_2 that the formation can hold, however it does not take into consideration the adsorption of CO_2 and release of additional methane (CH_4) that will occur as the sequestered CO_2 interacts with the shale. Recent studies have found that CO_2 has an adsorption capacity 5 to 10 times greater than CH_4 (Kang et al, 2010). This means that capacity calculations made using estimates of production alone may be skewed toward lower values because additional methane will be released as the shale reacts with CO_2.

Dr. Brandon Nuttall of the Kentucky Geological Survey, working as part of the MRCSP, has developed a method to account for adsorption while calculating sequestration storage capacity. Field tests for CO_2 adsorption in the Marcellus Shale were used by Nuttall to derive a relationship between adsorption and TOC at 400 psia (Figure 31). While the pressure in the Utica is much higher than that of the Marcellus (possibly 10 times greater in the southern portion of the fairway), we lack the means to repeat Nuttall's field tests for the Utica and have elected to use the equation from his Marcellus study until a more appropriate adsorption data is collected.

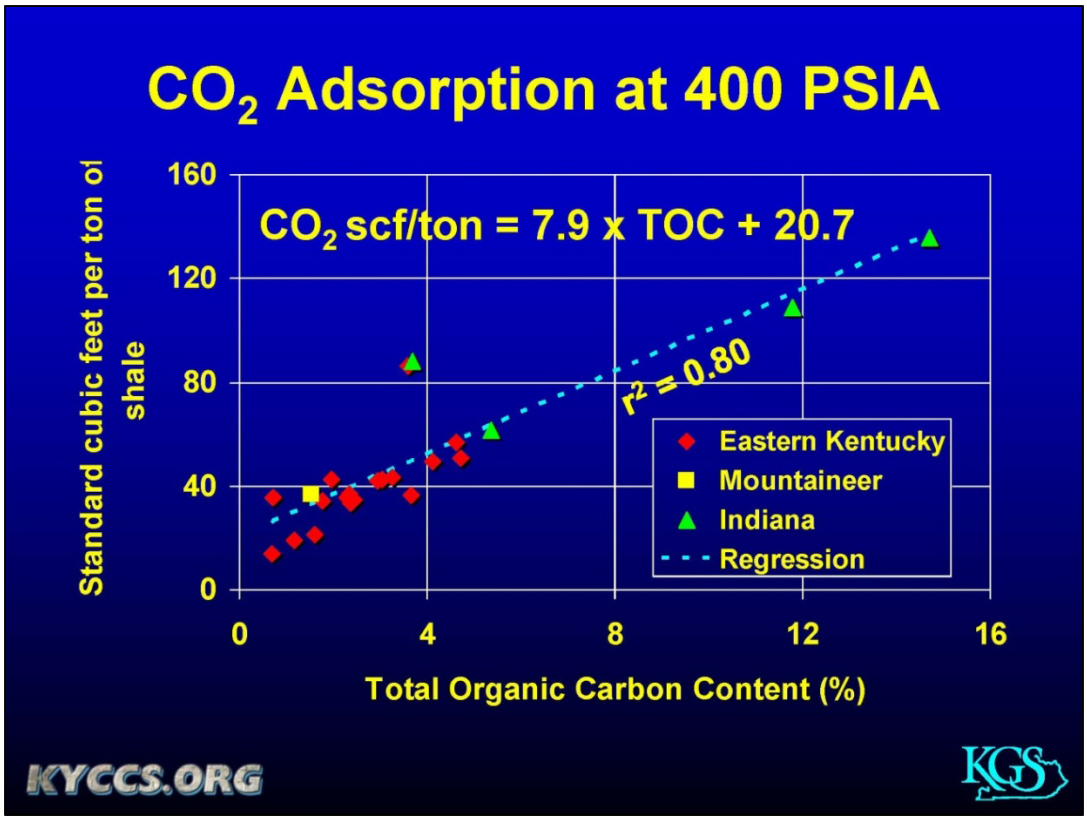

Figure 31. Graph of CO2 adsorption vs. TOC from Kentucky Geological Survey field work Source: Dr. Brandon Nuttall, Kentucky Geological Survey

Using the average TOC value for each of the 28 wells in the fairway and the feet of TOC greater than 1% as a thickness, the equation developed by Nuttall was used to calculate the storage capacity for the square kilometer area surrounding each well. These capacities were then averaged to get an average capacity per square kilometer of fairway. By multiplying this average by the 13,000 km^2 area of defined fairway, we estimate a capacity of approximately 0.13 Gt of CO_2 (Table 3). It is important to note that although this estimate may be low due to the adsorption coefficient described above, it is also partially biased toward a higher capacity because, like the pore volume capacity calculation, it assumes the entire area of the fairway will be accessible for sequestration.

6.5 CAPACITY COMPARISON

Of the three CO_2 storage potentials calculated above, the capacity estimate with adsorption was the lowest. This is surprising considering adsorption should allow for the storage of an additional volume of CO_2 beyond that of free gas replacement alone. As mentioned in section 6.4 this may be, in part, due to the use of an absorption coefficient derived from fieldwork on a different shale formation at significantly lower pressures.

In 2011, NYSERDA published a report prepared by Advanced Resources International Inc. in which they estimate CO_2 storage capacities for both the Utica and Marcellus Shales in NY (NYSERDA Report 12-02). In this study significant attention was given to calculating the amount of adsorbed methane in organic-rich shales. These values were then included in their calculations of CO_2 storage capacity thereby accounting for the release of adsorbed methane and adsorption of CO_2. Their study calculated a maximum storage capacity of 19.63 Gt for the Utica in a 16 county area (3,808,702 acres). However, they did not use an efficiency factor, and instead assumed 100% replacement of the calculated gas in place. If the same 4% efficiency factor used in our equations is applied, the capacity becomes 0.79 Gt which is still higher than any of our calculated capacities, but within the same order of magnitude.

It is also important to note that the capacities based on pore volume and production are not without their own uncertainties. The TOC data acquired in this study was collected using strict laboratory practices to ensure the highest possible accuracy. The carbon coulometer was set to UIC for a complete manufacturer calibration at the beginning of this study. Duplicate samples were run every 10 samples to test consistency, and blanks were run every 8 samples to recalculate background CO2. However, these TOC values were then used in calculations that make broad assumptions such as 1.0 wt% TOC = 0.8% porosity. Also, the projected production of 3.7 Tcf used in the capacity from production calculation was derived as a fraction of the production estimate for the entire Appalachian Basin even though the Utica will certainly not be equally productive across the entire area. Perhaps the most significant caveat to these estimates is well distribution across the fairway. As mentioned in section 6.3, only 28 of the 61 wells sampled in this study

WELL API	TOP of Utica	BASE of Utica	MEAN TOC (wt%)	FEET of TOC > 1%	MEAN Density	Tons of Shale per km²ft	CO2 Adsorption @ 400 PSIA	CO2 Capacity (mcf/km²ft)	CO2 Capacity conversion (tons/km²ft)	efficiency factor (4%)	CO2 capacity of km² around well
EQUATION	From Log	From Log	Measured	Measured	From Log	= 302000*F2	= (7.9*D2)+20.7	=(G2*H2)/1000	= I2*0.052	Standard	= J2*K2*E2
31077040550000	2459	4247	1.63	732.03	2.59	782180	34	26290.51	1367.11	0.04	40030.35
31065039280000	2826	3226	1.89	350.45	2.59	782180	36	27878.88	1449.70	0.04	20322.05
31053095780000	3433	3781	1.10	251.65	2.64	796347	29	23411.11	1217.38	0.04	12253.91
31053040320000	3579	3772	2.02	163.95	2.59	782180	37	28674.76	1491.09	0.04	9778.73
31077045470000	3698	4308	1.53	255.00	2.59	782180	33	25645.09	1333.54	0.04	13602.15
31053194850000	3801	4003	1.99	142.31	2.61	788727	36	28714.71	1493.17	0.04	8499.95
31077108340000	4013	4508	1.49	450.00	2.63	794737	33	25829.89	1343.15	0.04	24176.78
31071010010000	4450	4681	1.54	80.00	2.74	826266	33	27186.54	1413.70	0.04	4523.84
31101217030000	5353	5772	0.38	0.00	2.72	820872	24	19441.79	1010.97	0.04	0.00
31039039040000	5546	6028	1.25	350.00	2.59	782180	31	23919.29	1243.80	0.04	17413.25
31025043790000	5917	6770	1.67	725.40	2.59	782180	34	26527.91	1379.45	0.04	40026.15
31023215000000	6022	6177	1.81	152.66	2.62	791255	35	27685.07	1439.62	0.04	8790.76
31023047140000	6661	6895	1.42	149.80	2.59	782180	32	24938.25	1296.79	0.04	7770.24
31025043640000	6832	7393	0.61	70.00	2.59	782180	26	19973.12	1038.60	0.04	2908.09
31097229350000	7135	7921	0.68	10.00	2.72	820579	26	21384.10	1111.97	0.04	444.79
31109044670000	7136	7350	1.01	120.00	2.06	621108	29	17802.36	925.72	0.04	4443.47
31025042140000	7410	8240	1.18	495.43	2.59	782180	30	23496.70	1221.83	0.04	24213.20
31007050870000	7414	7540	0.61	4.66	2.59	782180	25	19945.37	1037.16	0.04	193.18
31109039730000	7453	7763	1.46	10.00	2.59	782180	32	25212.79	1311.07	0.04	524.43
31015232280000	7894	8660	2.09	10.00	2.59	782180	37	29105.70	1513.50	0.04	605.40
31015004430000	8067	8901	3.19	10.00	2.59	782180	46	35902.84	1866.95	0.04	746.78
31101230550000	8448	9182	1.14	67.49	2.59	782180	30	23238.47	1208.40	0.04	3262.30
31015229790000	8763	8885	2.41	122.12	2.61	787441	40	31275.81	1626.34	0.04	7944.62
31015103350000	8960	9329	2.00	80.00	2.56	774467	36	28249.01	1468.95	0.04	4700.64
31107239270000	8982	9652	0.41	0.00	2.64	797081	24	19073.70	991.83	0.04	0.00
31101231900000	9140	9235	0.36	0.00	2.60	783693	24	18436.29	958.69	0.04	0.00
31101039240000	9436	9674	1.20	48.74	2.59	782180	30	23629.24	1228.72	0.04	2395.46
31107231920000	10313	10577	1.73	190.00	2.59	782180	34	26858.81	1396.66	0.04	10614.60
						no RHOB curve, used average				Average Capacity (tons/km²)	9,649
										Capacity for NY Utica Fairway (gigatons)	0.13

Table 3. CO2 capacity calculations with adsorption

lie within the Utica fairway we have defined. In both the pore volume and adsorption methods, the final capacity was calculated by averaging the 28 individual well capacities, then multiplying that value by the area of the fairway. Each of those 28 values were treated equally although their locations do not represent an even distribution across the fairway area. It may be the case that more wells lie in an area of higher capacity thereby shifting the average and final capacity to an inflated value. These discrepancies show the need for more data and a refinement of the method used to calculate storage capacities in shale.

Section 7
CONCLUSIONS

The Utica Shale in New York has potential to produce gas over a wide area, but there are a few variables that make it less appealing than the Marcellus Shale as a gas reservoir.

On the negative side, the TOC is quite low when compared to the Marcellus and other shale gas reservoirs. The highest values are around 3 wt% and most of the organic-rich Utica is between 1 and 3 wt% TOC. There is little or no porosity other than organic porosity and these values are likely to be less than 3% in most cases. The Utica is super-mature in most of the area where it is buried deeply enough to be hydraulically fractured. Using vitrinite reflectance equivalents, most of the Utica in New York has R_o values greater than 4.0. Some have suggested that there is a thermal maturity cutoff between 3.2 and 4.0 and that shales with higher R_o values are much less likely to produce. Also, the Utica does not appear to be overpressured. The Marcellus produces at high rates where it is overpressured.

On the positive side, the organic-rich Utica occurs across a large area (5,000 square miles). This is a much larger area than the Marcellus is likely to produce from in New York. It is also quite thick in places, with one well having up to 1,300 feet of strata with greater than 1 wt% TOC, and many others having several hundred feet. The Utica Shale is buried deeply enough to drill horizontal wells and hydraulically fracture them across a wide area.

These factors may conspire to make the Utica sub-economic in New York. But there is still a chance for economic production, thus the area of potential is listed as possible rather than probable.

Sequestering carbon dioxide in organic-rich shales is a relatively new concept and therefore the methods for calculating storage capacity is still in development. We have presented estimated storage capacities for the Utica fairway in NY using three techniques: potential production, pore volume, and adsorption. Although these capacities vary, they are all within an order of magnitude, and all suggest less than one gigaton of storage capacity in the productive part of the Utica in NY.

Section 8
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APPENDIX A

TOC and Carbonate Content Analyses

31-003-04248-00-00			
API	Depth (ft)	% TOC	wt% Carbonate
31-003-04248-00-00	5150	0.13	
31-003-04248-00-00	5160	0.10	
31-003-04248-00-00	5170	0.14	
31-003-04248-00-00	5180	0.18	
31-003-04248-00-00	5190	0.17	
31-003-04248-00-00	5200	0.18	14.16
31-003-04248-00-00	5210	0.10	
31-003-04248-00-00	5220	0.12	12.09
31-003-04248-00-00	5230	0.14	
31-003-04248-00-00	5240	0.14	12.38
31-003-04248-00-00	5250	0.15	
31-003-04248-00-00	5260	0.18	19.53
31-003-04248-00-00	5270	0.19	
31-003-04248-00-00	5280	0.14	17.97
31-003-04248-00-00	5290	0.16	
31-003-04248-00-00	5300	0.14	17.78
31-003-04248-00-00	5310	0.17	
31-003-04248-00-00	5320	0.15	19.54
31-003-04248-00-00	5330	0.17	
31-003-04248-00-00	5340	2.01	16.66
31-003-04248-00-00	5350	0.18	
31-003-04248-00-00	5360	0.22	19.59
31-003-04248-00-00	5370	0.18	
31-003-04248-00-00	5380	0.19	17.58
31-003-04248-00-00	5390	0.18	
31-003-04248-00-00	5400	0.22	13.66
31-003-04248-00-00	5410	0.20	
31-003-04248-00-00	5420	0.18	11.19
31-003-04248-00-00	5430	0.20	
31-003-04248-00-00	5440	0.21	15.01
31-003-04248-00-00	5450	0.20	
31-003-04248-00-00	5460	0.18	18.26
31-003-04248-00-00	5470	0.26	
31-003-04248-00-00	5480	0.27	14.71
31-003-04248-00-00	5490	0.28	
31-003-04248-00-00	5500	0.31	14.66
31-003-04248-00-00	5510	0.31	
31-003-04248-00-00	5520	0.22	14.32
31-003-04248-00-00	5530	0.24	
31-003-04248-00-00	5540	0.17	21.32
31-003-04248-00-00	5550	0.20	
31-003-04248-00-00	5560	0.23	15.61
31-003-04248-00-00	5570	0.25	
31-003-04248-00-00	5580	0.24	12.42
31-003-04248-00-00	5590	0.25	
31-003-04248-00-00	5600	0.26	12.48
31-003-04248-00-00	5610	0.27	
31-003-04248-00-00	5620	0.23	13.16
31-003-04248-00-00	5630	0.26	
31-003-04248-00-00	5640	0.28	10.76
31-003-04248-00-00	5650	0.25	
31-003-04248-00-00	5660	0.27	8.56
31-003-04248-00-00	5670	0.27	
31-003-04248-00-00	5680	0.31	11.26
31-003-04248-00-00	5690	0.28	
31-003-04248-00-00	5700	0.35	12.72
31-003-04248-00-00	5710	0.39	
31-003-04248-00-00	5720	0.52	13.57
31-003-04248-00-00	5730	0.47	
31-003-04248-00-00	5740	0.38	11.92
31-003-04248-00-00	5750	0.36	
31-003-04248-00-00	5760	0.37	14.04
31-003-04248-00-00	5770	0.40	
31-003-04248-00-00	5780	0.35	16.55
31-003-04248-00-00	5790	0.51	
31-003-04248-00-00	5800	0.46	12.74
31-003-04248-00-00	5810	0.46	11.59
31-003-04248-00-00	5820	0.62	11.84
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31-003-04248-00-00	5870	0.62	15.12
31-003-04248-00-00	5880	0.68	19.97
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31-003-04248-00-00	5910	0.42	60.06
31-003-04248-00-00	5920	0.36	57.60
31-003-04248-00-00	5930	0.32	126.25
31-003-04248-00-00	5940	0.28	79.40
31-003-04248-00-00	5950	0.22	76.26
31-003-04248-00-00	5960	0.23	77.38
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31-003-04248-00-00	5980	0.24	85.34
31-003-04248-00-00	5990	0.22	83.70
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31-003-04248-00-00	6020	0.32	65.23
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31-003-04248-00-00	6040	0.29	40.93
31-003-04248-00-00	6050	0.09	41.82
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31-003-04248-00-00	6070	0.23	53.04
31-003-04248-00-00	6080	0.19	54.05
31-003-04248-00-00	6090	0.16	23.49
31-003-04248-00-00	6100	0.31	45.70
31-003-04248-00-00	6110	0.48	
31-003-04248-00-00	6120	0.54	62.02
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31-003-04248-00-00	6170	0.58	
31-003-04248-00-00	6180	0.59	69.21
31-003-04248-00-00	6190	0.61	
31-003-04248-00-00	6200	0.64	67.73
Duplicates			
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31-003-04248-00-00	5400-2	0.20	
31-003-04248-00-00	5530-2	0.21	
31-003-04248-00-00	5770-2	0.45	
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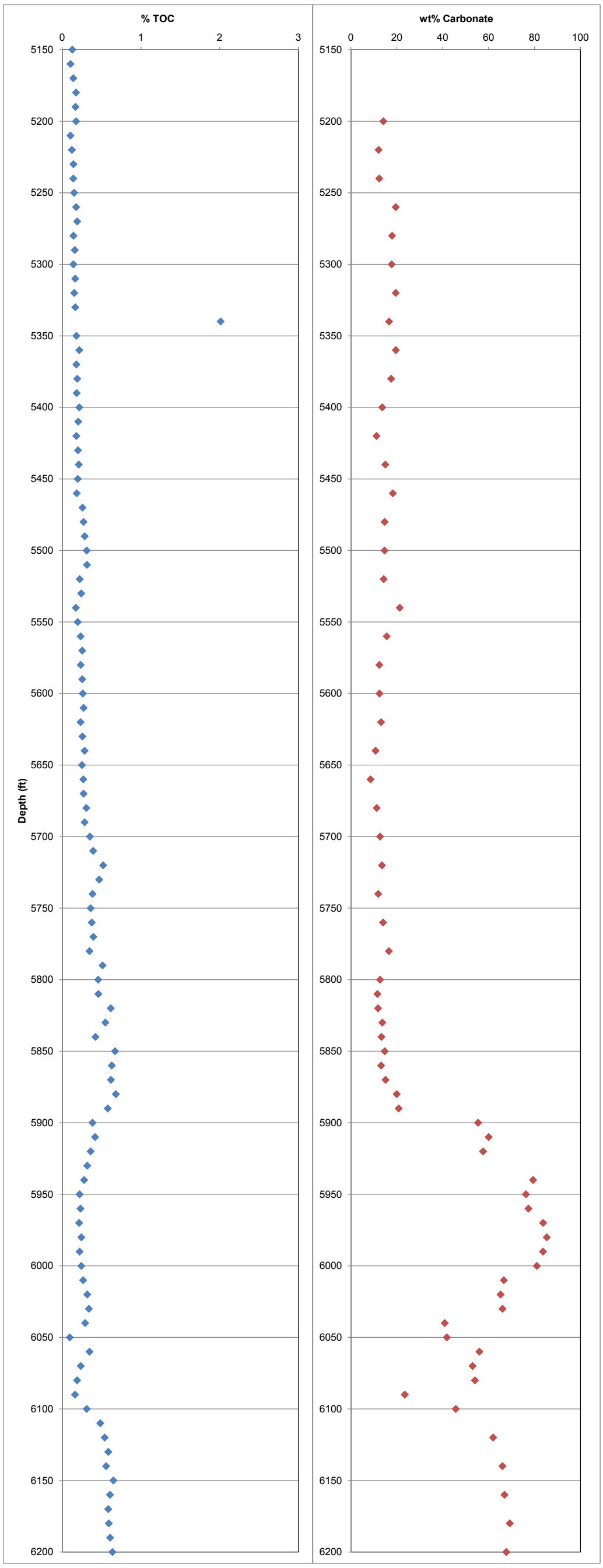
31-003-04248-00-00	6150-2	0.65	



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API	Depth (ft)	% TOC	wt% Carbonate
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31-007-05087-00-00	7410	0.48	16.61
31-007-05087-00-00	7420	0.35	18.81
31-007-05087-00-00	7430	0.39	21.02
31-007-05087-00-00	7440	0.44	19.28
31-007-05087-00-00	7450	0.36	18.56
31-007-05087-00-00	7460	0.36	19.24
31-007-05087-00-00	7470	0.59	16.49
31-007-05087-00-00	7480	0.54	18.16
31-007-05087-00-00	7490	0.47	20.69
31-007-05087-00-00	7500	0.60	20.91
31-007-05087-00-00	7510	0.96	24.36
31-007-05087-00-00	7520	0.65	24.85
31-007-05087-00-00	7530	0.91	24.51
31-007-05087-00-00	7540	1.67	26.5
31-007-05087-00-00	7550	1.58	31.38
31-007-05087-00-00	7560	2.05	34.56
31-007-05087-00-00	7570	1.48	27.41
31-007-05087-00-00	7580	1.37	40.53
31-007-05087-00-00	7595	1.50	45.59
31-007-05087-00-00	7600	1.48	45.17
31-007-05087-00-00	7610	0.93	45.37
31-007-05087-00-00	7620	1.36	36.29
31-007-05087-00-00	7630	1.32	40.13
31-007-05087-00-00	7640	1.46	43.94
31-007-05087-00-00	7650	1.44	33.14
31-007-05087-00-00	7660	1.20	39.69
31-007-05087-00-00	7670	1.22	65.28
31-007-05087-00-00	7680	0.97	61.75
31-007-05087-00-00	7690	1.38	58.24
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31-007-05087-00-00	7730	1.40	57.65
31-007-05087-00-00	7740	0.95	76.02
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31-007-05087-00-00	7770	0.28	80.94
31-007-05087-00-00	7780	0.37	78.55
31-007-05087-00-00	7790	0.28	80.4
31-007-05087-00-00	7800	0.33	80.99
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31-007-05087-00-00	7900	0.17	80.57
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31-007-05087-00-00	7930	0.18	90.08
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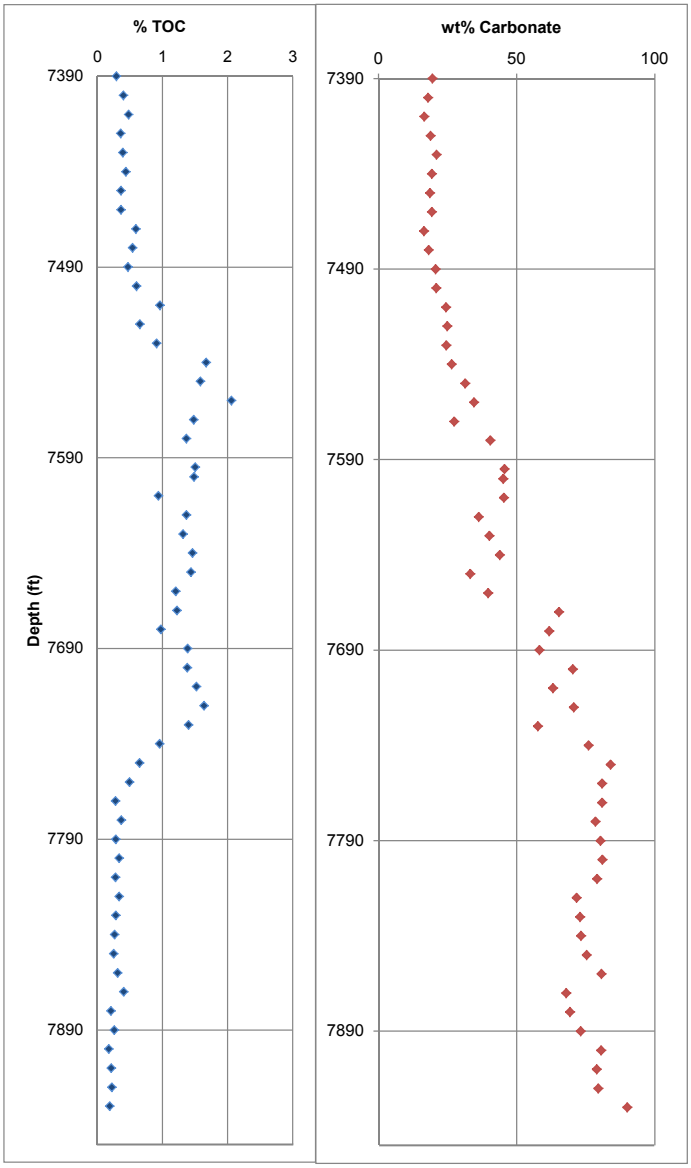

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31-009-08610-00-00	5630	0.84	3.73
31-009-08610-00-00	5640	0.45	3.34
31-009-08610-00-00	5650	0.60	4.50
31-009-08610-00-00	5660	0.39	4.93
31-009-08610-00-00	5670	1.15	1.50
31-009-08610-00-00	5680	0.46	5.82
31-009-08610-00-00	5690	0.48	4.57
31-009-08610-00-00	5700	0.70	4.23
31-009-08610-00-00	5710	0.58	4.54
31-009-08610-00-00	5720	1.30	5.16
31-009-08610-00-00	5730	0.64	4.56
31-009-08610-00-00	5750	0.57	5.01
31-009-08610-00-00	5760	0.65	2.84
31-009-08610-00-00	5780	0.52	3.63
31-009-08610-00-00	5790	0.58	2.25
31-009-08610-00-00	5800	0.62	3.37
31-009-08610-00-00	5810	0.56	4.12
31-009-08610-00-00	5820	0.38	62.21
31-009-08610-00-00	5830	0.31	69.58
31-009-08610-00-00	5840	0.33	65.18
31-009-08610-00-00	5850	0.30	69.15
31-009-08610-00-00	5860	0.35	59.41
31-009-08610-00-00	5870	0.25	73.74
31-009-08610-00-00	5880	0.24	72.20
31-009-08610-00-00	5890	0.17	76.21
31-009-08610-00-00	5900	0.19	68.27
31-009-08610-00-00	5910	0.25	61.69
31-009-08610-00-00	5920	0.31	54.74
31-009-08610-00-00	5930	0.27	54.07
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31-009-08610-00-00	5980	0.35	48.22
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31-009-08610-00-00	6080	0.32	55.81
31-009-08610-00-00	6090	0.31	62.22
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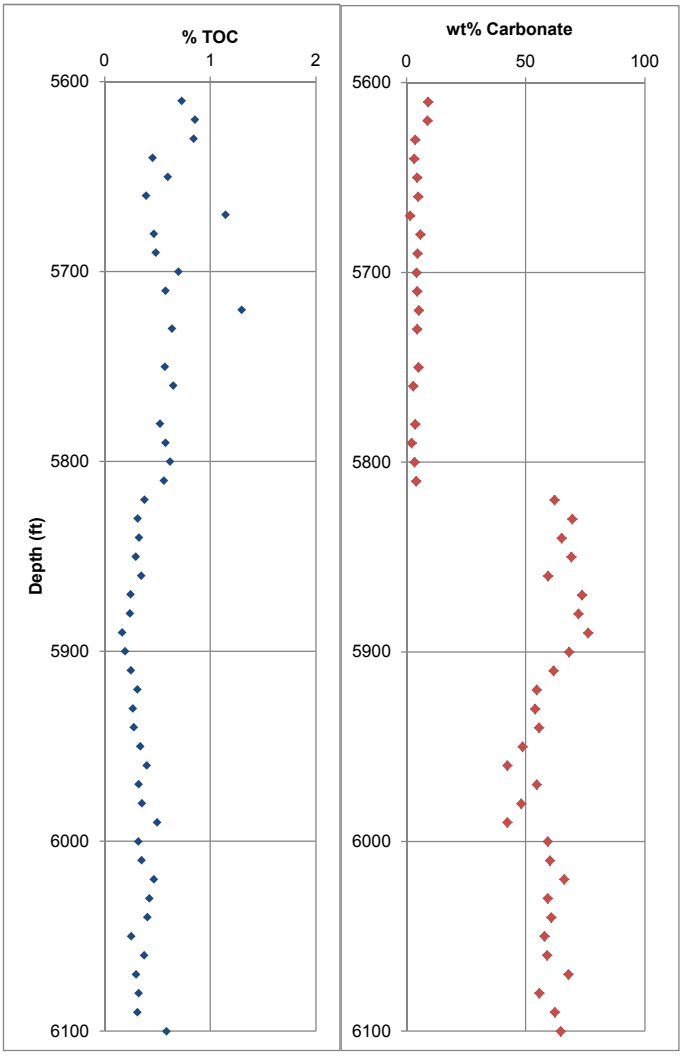

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31-009-09235-00-00	8440	0.51
31-009-09235-00-00	8450	0.55
31-009-09235-00-00	8460	0.55
31-009-09235-00-00	8470	0.63
31-009-09235-00-00	8480	0.59
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31-009-09235-00-00	8500	0.55
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31-009-09235-00-00	8570	0.68
31-009-09235-00-00	8580	0.66
31-009-09235-00-00	8590	0.79
31-009-09235-00-00	8600	0.82
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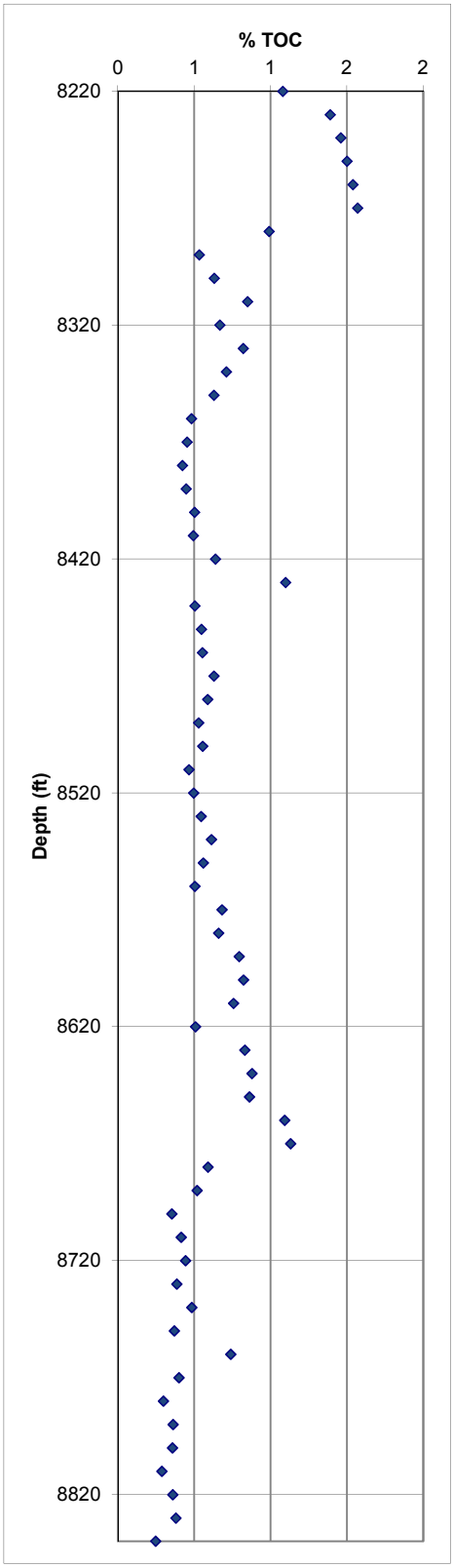
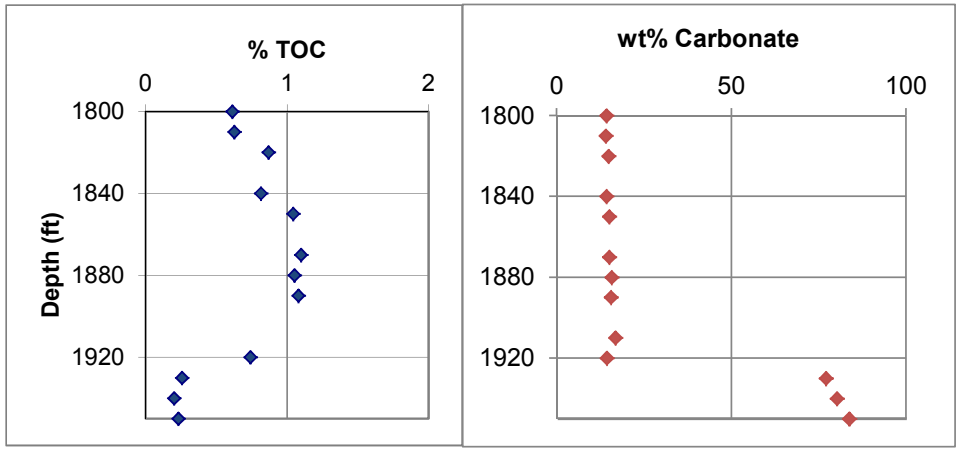
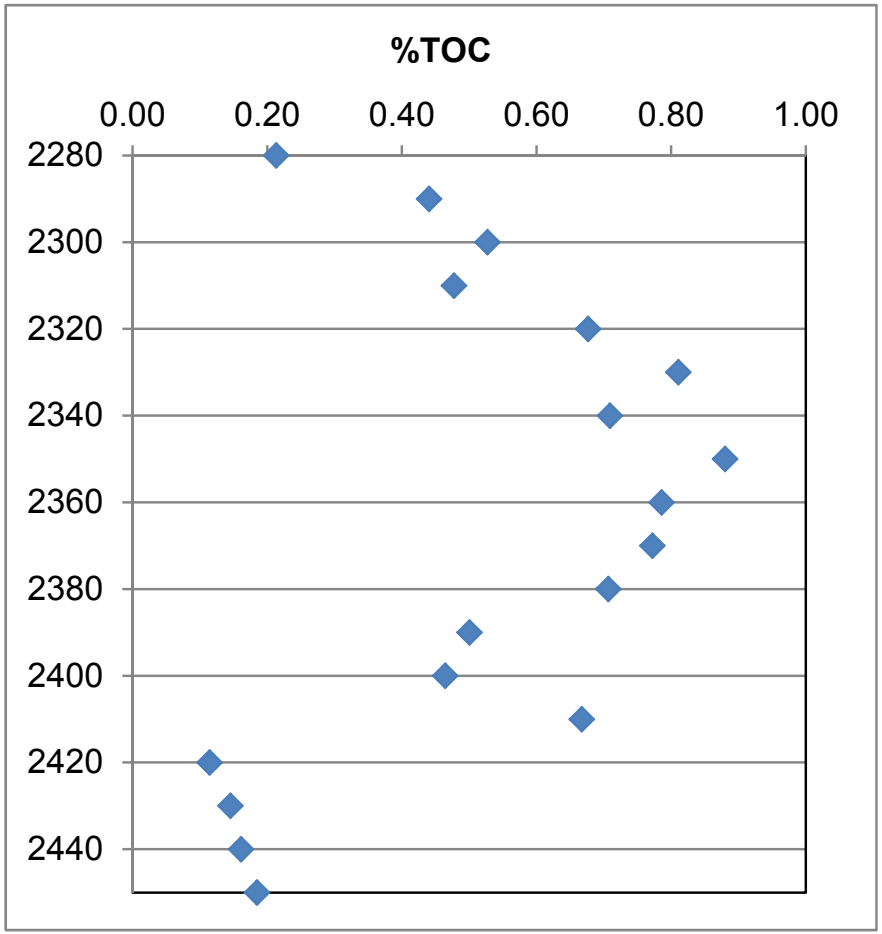
31-009-09235-00-00	8730	0.39
31-009-09235-00-00	8740	0.48
31-009-09235-00-00	8750	0.37
31-009-09235-00-00	8760	0.74
31-009-09235-00-00	8770	0.40
31-009-09235-00-00	8780	0.30
31-009-09235-00-00	8790	0.36
31-009-09235-00-00	8800	0.36
31-009-09235-00-00	8810	0.29
31-009-09235-00-00	8820	0.36
31-009-09235-00-00	8830	0.38
31-009-09235-00-00	8840	0.25
Duplicates		
31-009-09235-00-00	8400-2	0.49
31-009-09235-00-00	8660-2	1.08
31-009-09235-00-00	8360-2	0.45



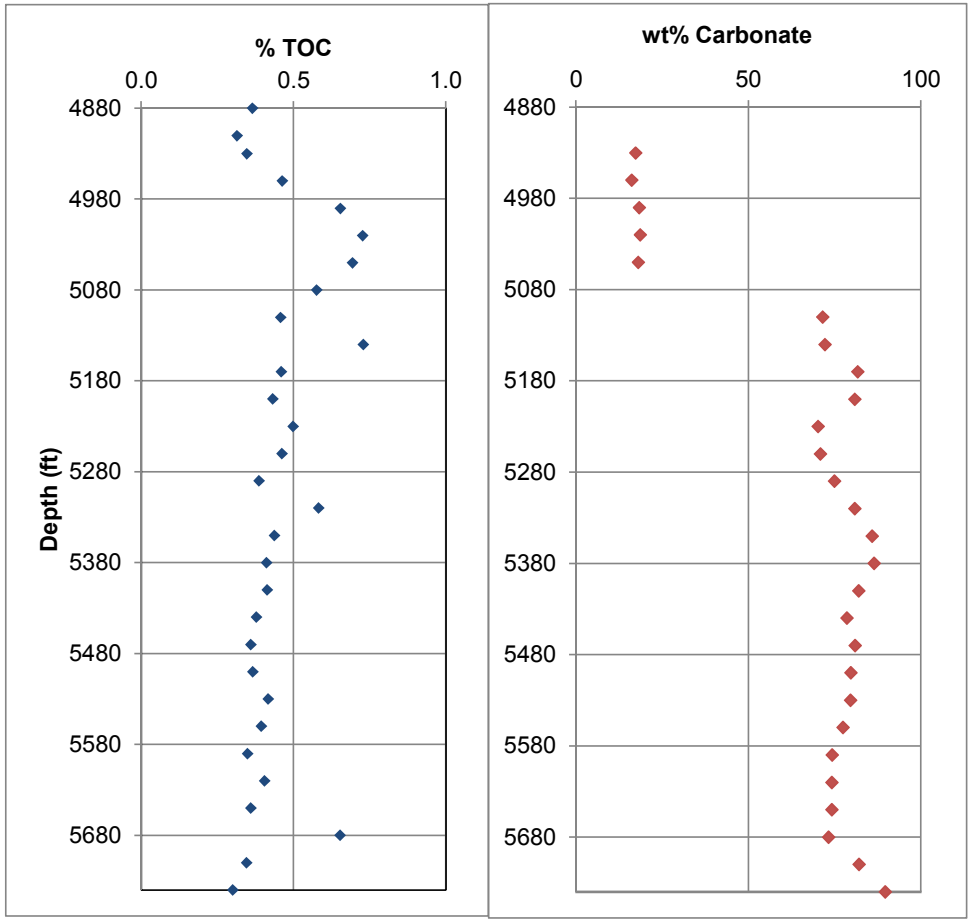
31-011-04624-00-00			
API	Depth (ft)	% TOC	wt% Carbonate
31-011-04624-00-00	1800	0.61	14.26
31-011-04624-00-00	1810	0.63	14.09
31-011-04624-00-00	1820	0.87	14.94
31-011-04624-00-00	1840	0.81	14.26
31-011-04624-00-00	1850	1.04	15.05
31-011-04624-00-00	1870	1.10	15.12
31-011-04624-00-00	1880	1.05	15.79
31-011-04624-00-00	1890	1.08	15.60
31-011-04624-00-00	1910		16.89
31-011-04624-00-00	1920	0.74	14.41
31-011-04624-00-00	1930	0.26	77.08
31-011-04624-00-00	1940	0.20	80.25
31-011-04624-00-00	1950	0.23	83.77



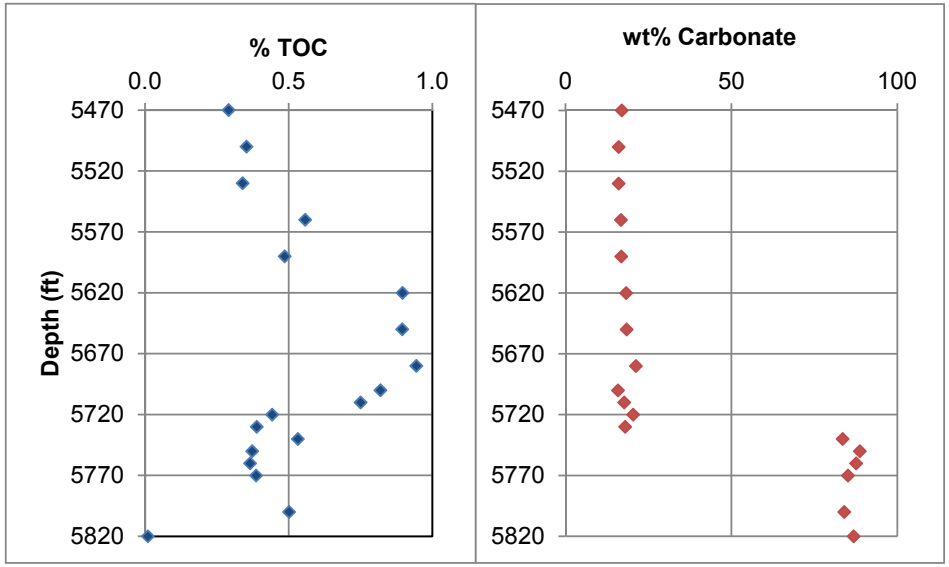
31-011-17508-00-00		
API	Depth (ft)	%TOC
31-011-17508-00-00	2280	0.21
31-011-17508-00-00	2290	0.44
31-011-17508-00-00	2300	0.53
31-011-17508-00-00	2310	0.48
31-011-17508-00-00	2320	0.68
31-011-17508-00-00	2330	0.81
31-011-17508-00-00	2340	0.71
31-011-17508-00-00	2350	0.88
31-011-17508-00-00	2360	0.79
31-011-17508-00-00	2370	0.77
31-011-17508-00-00	2380	0.71
31-011-17508-00-00	2390	0.50
31-011-17508-00-00	2400	0.46
31-011-17508-00-00	2410	0.67
31-011-17508-00-00	2420	0.11
31-011-17508-00-00	2430	0.15
31-011-17508-00-00	2440	0.16
31-011-17508-00-00	2450	0.18



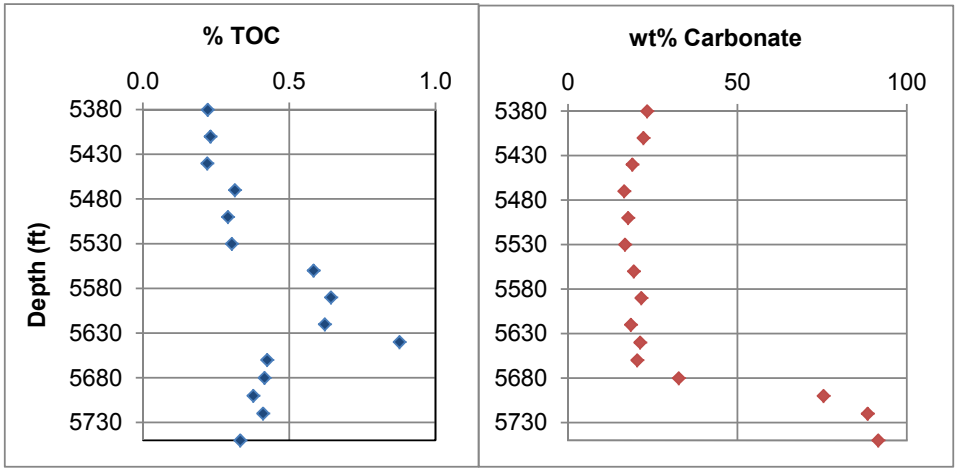
31-011-23158-00-00			
API	Depth (ft)	% TOC	wt% Carbonate
31-011-23158-00-00	4880	0.37	
31-011-23158-00-00	4910	0.31	
31-011-23158-00-00	4930	0.35	17.26
31-011-23158-00-00	4960	0.46	16.16
31-011-23158-00-00	4990	0.65	18.36
31-011-23158-00-00	5020	0.73	18.60
31-011-23158-00-00	5050	0.69	18.04
31-011-23158-00-00	5080	0.58	
31-011-23158-00-00	5110	0.46	71.47
31-011-23158-00-00	5140	0.73	72.15
31-011-23158-00-00	5170	0.46	81.66
31-011-23158-00-00	5200	0.43	80.82
31-011-23158-00-00	5230	0.50	70.15
31-011-23158-00-00	5260	0.46	70.84
31-011-23158-00-00	5290	0.39	74.97
31-011-23158-00-00	5320	0.58	80.84
31-011-23158-00-00	5350	0.44	85.82
31-011-23158-00-00	5380	0.41	86.39
31-011-23158-00-00	5410	0.41	81.91
31-011-23158-00-00	5440	0.38	78.53
31-011-23158-00-00	5470	0.36	80.90
31-011-23158-00-00	5500	0.37	79.66
31-011-23158-00-00	5530	0.42	79.58
31-011-23158-00-00	5560	0.39	77.37
31-011-23158-00-00	5590	0.35	74.23
31-011-23158-00-00	5620	0.40	74.19
31-011-23158-00-00	5650	0.36	74.14
31-011-23158-00-00	5680	0.65	73.17
31-011-23158-00-00	5710	0.35	82.01
31-011-23158-00-00	5740	0.30	89.61
Duplicates			
31-011-23158-00-00	4960-2	0.45	
31-011-23158-00-00	5440-2	0.37	
31-011-23158-00-00	5740-2	0.23	



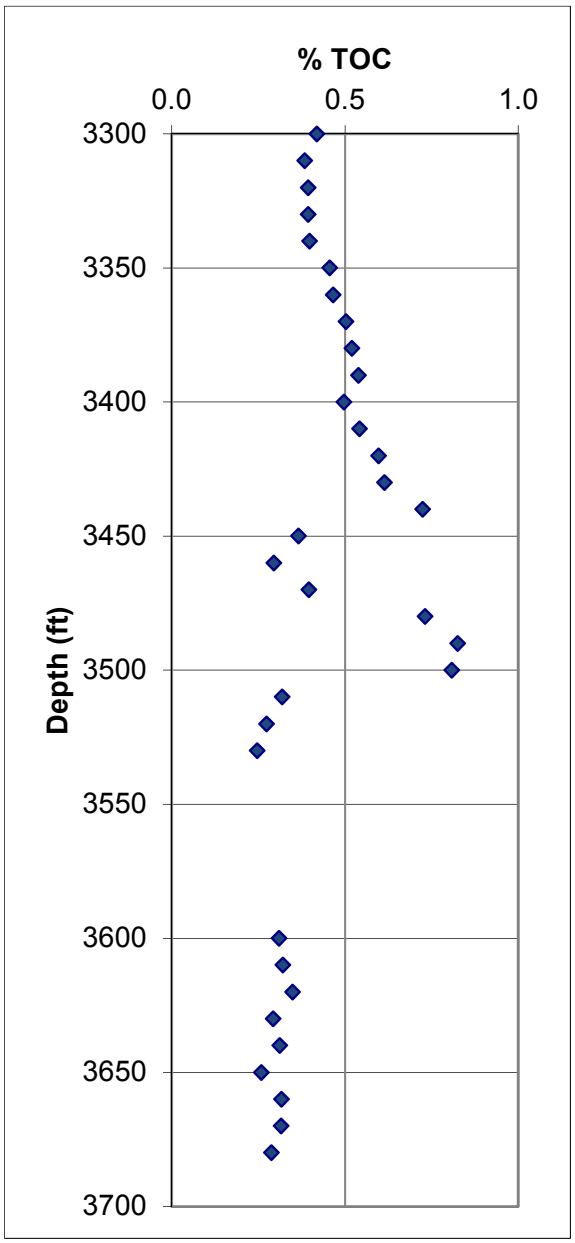
31-011-23840-00-00			
API	Depth (ft)	% TOC	wt% Carbonate
31-011-23840-00-00	5470	0.29	16.93
31-011-23840-00-00	5500	0.35	15.98
31-011-23840-00-00	5530	0.34	15.99
31-011-23840-00-00	5560	0.56	16.70
31-011-23840-00-00	5590	0.49	16.75
31-011-23840-00-00	5620	0.90	18.24
31-011-23840-00-00	5650	0.89	18.38
31-011-23840-00-00	5680	0.94	21.16
31-011-23840-00-00	5700	0.82	15.77
31-011-23840-00-00	5710	0.75	17.66
31-011-23840-00-00	5720	0.44	20.37
31-011-23840-00-00	5730	0.39	17.96
31-011-23840-00-00	5740	0.53	83.50
31-011-23840-00-00	5750	0.37	88.66
31-011-23840-00-00	5760	0.37	87.53
31-011-23840-00-00	5770	0.39	85.09
31-011-23840-00-00	5800	0.50	83.95
31-011-23840-00-00	5820	0.01	86.83
Duplicates			
31-011-23840-00-00	5530-2	0.34	
31-011-23840-00-00	5740-2	0.48	



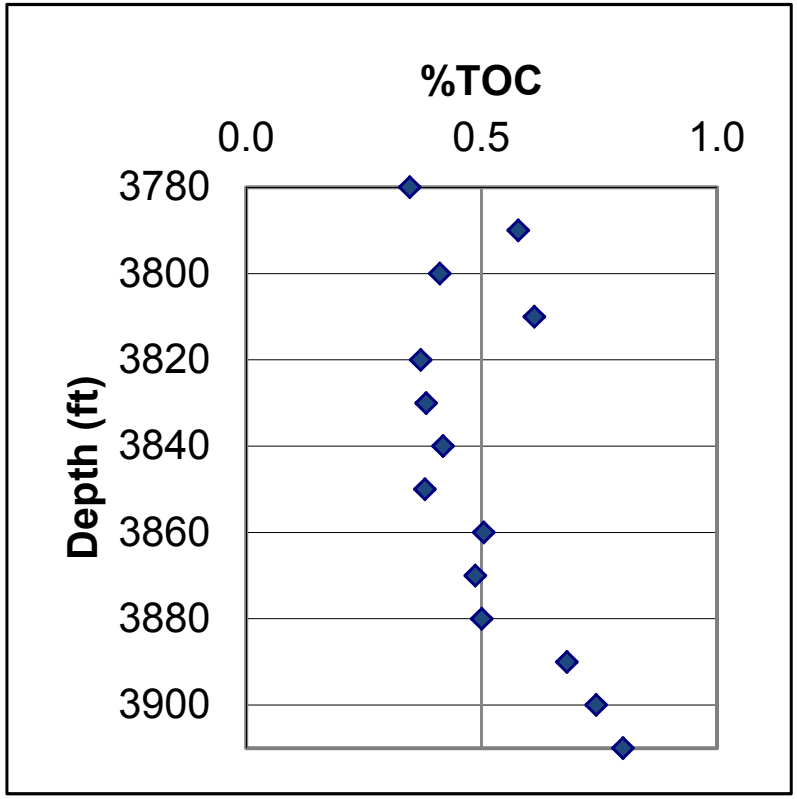
31-011-23982-00-00			
API	Depth (ft)	% TOC	wt% Carbonate
31-011-23982-00-00	5380	0.22	23.31
31-011-23982-00-00	5410	0.23	22.21
31-011-23982-00-00	5440	0.22	18.94
31-011-23982-00-00	5470	0.31	16.55
31-011-23982-00-00	5500	0.29	17.71
31-011-23982-00-00	5530	0.30	16.81
31-011-23982-00-00	5560	0.58	19.38
31-011-23982-00-00	5590	0.64	21.62
31-011-23982-00-00	5620	0.62	18.50
31-011-23982-00-00	5640	0.88	21.27
31-011-23982-00-00	5660	0.42	20.41
31-011-23982-00-00	5680	0.42	32.63
31-011-23982-00-00	5700	0.38	75.38
31-011-23982-00-00	5720	0.41	88.43
31-011-23982-00-00	5750	0.33	91.55
Duplicates			
31-011-23982-00-00	5660-2	0.44	
31-011-23982-00-00	5410-2	0.23	



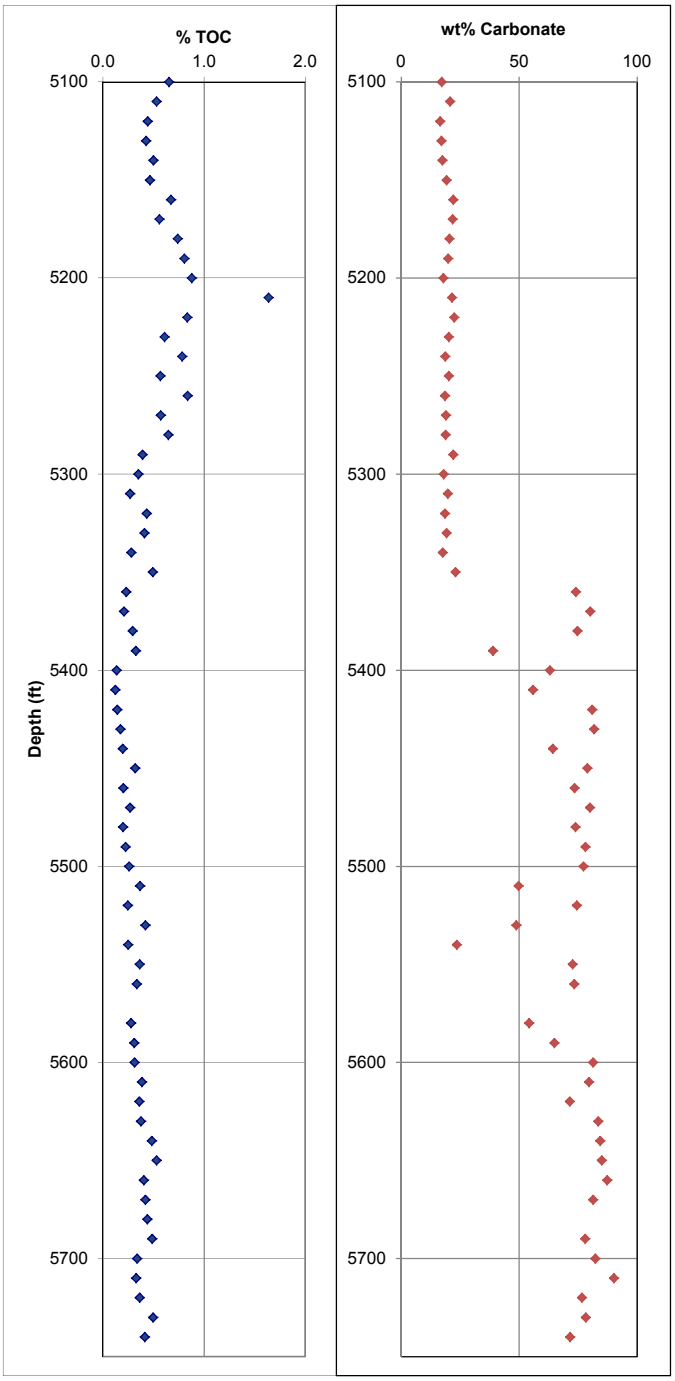
31-011-90001-00-00		
API	Depth	% TOC
31-011-90001-00-00	3300	0.42
31-011-90001-00-00	3310	0.38
31-011-90001-00-00	3320	0.39
31-011-90001-00-00	3330	0.39
31-011-90001-00-00	3340	0.40
31-011-90001-00-00	3350	0.46
31-011-90001-00-00	3360	0.47
31-011-90001-00-00	3370	0.50
31-011-90001-00-00	3380	0.52
31-011-90001-00-00	3390	0.54
31-011-90001-00-00	3400	0.50
31-011-90001-00-00	3410	0.54
31-011-90001-00-00	3420	0.60
31-011-90001-00-00	3430	0.61
31-011-90001-00-00	3440	0.72
31-011-90001-00-00	3450	0.37
31-011-90001-00-00	3460	0.29
31-011-90001-00-00	3470	0.40
31-011-90001-00-00	3480	0.73
31-011-90001-00-00	3490	0.82
31-011-90001-00-00	3500	0.81
31-011-90001-00-00	3510	0.32
31-011-90001-00-00	3520	0.27
31-011-90001-00-00	3530	0.25
31-011-90001-00-00	3600	0.31
31-011-90001-00-00	3610	0.32
31-011-90001-00-00	3620	0.35
31-011-90001-00-00	3630	0.29
31-011-90001-00-00	3640	0.31
31-011-90001-00-00	3650	0.26
31-011-90001-00-00	3660	0.32
31-011-90001-00-00	3670	0.32
31-011-90001-00-00	3680	0.29
Duplicates		
31-011-90001-00-00	3680-2	0.30
31-011-90001-00-00	3400-2	0.50



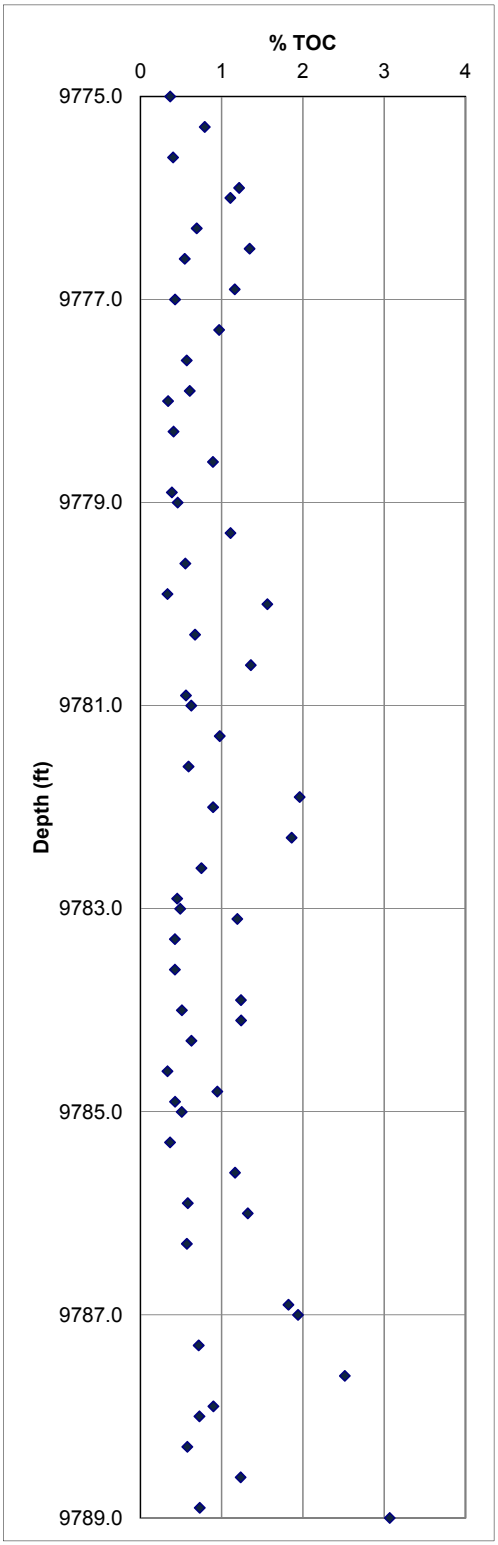
31-013-09939-00-00		
API	**Depth (ft)**	**% TOC**
31-013-09939-00-00	3780	0.35
31-013-09939-00-00	3790	0.58
31-013-09939-00-00	3800	0.41
31-013-09939-00-00	3810	0.61
31-013-09939-00-00	3820	0.37
31-013-09939-00-00	3830	0.38
31-013-09939-00-00	3840	0.42
31-013-09939-00-00	3850	0.38
31-013-09939-00-00	3860	0.50
31-013-09939-00-00	3870	0.49
31-013-09939-00-00	3880	0.50
31-013-09939-00-00	3890	0.68
31-013-09939-00-00	3900	0.74
31-013-09939-00-00	3910	0.80
Duplicates		
31-013-09939-00-00	3870-2	0.49
31-013-09939-00-00	3910-2	0.77



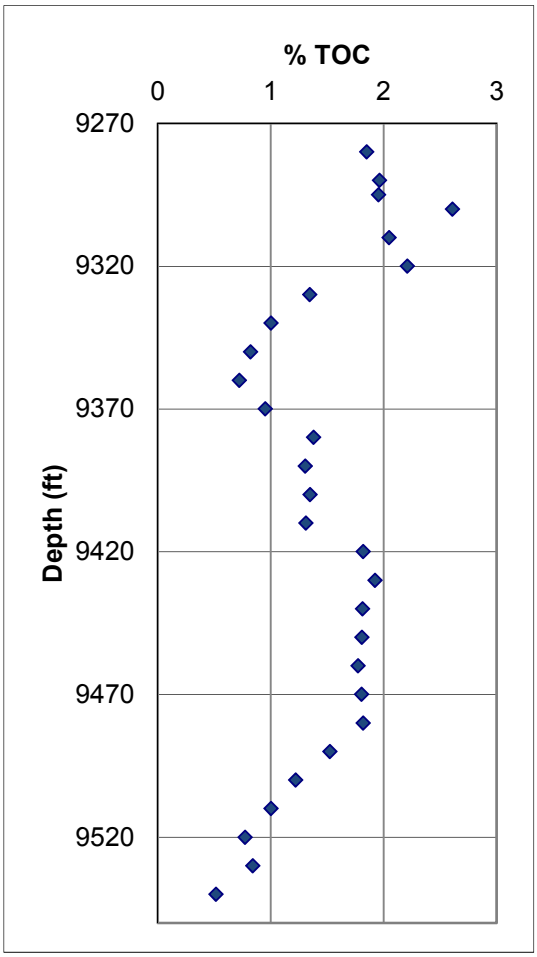
31-013-11387-00-00			
API	Depth (ft)	% TOC	wt% Carbonate
31-013-11387-00-00	5100	0.65	17.32
31-013-11387-00-00	5110	0.53	20.73
31-013-11387-00-00	5120	0.44	16.54
31-013-11387-00-00	5130	0.42	17.09
31-013-11387-00-00	5140	0.50	17.59
31-013-11387-00-00	5150	0.46	19.30
31-013-11387-00-00	5160	0.67	22.09
31-013-11387-00-00	5170	0.56	21.82
31-013-11387-00-00	5180	0.74	20.47
31-013-11387-00-00	5190	0.81	20.03
31-013-11387-00-00	5200	0.88	17.93
31-013-11387-00-00	5210	1.64	21.56
31-013-11387-00-00	5220	0.83	22.59
31-013-11387-00-00	5230	0.61	20.20
31-013-11387-00-00	5240	0.78	18.75
31-013-11387-00-00	5250	0.57	20.26
31-013-11387-00-00	5260	0.84	18.59
31-013-11387-00-00	5270	0.57	19.06
31-013-11387-00-00	5280	0.65	18.86
31-013-11387-00-00	5290	0.39	22.19
31-013-11387-00-00	5300	0.35	18.08
31-013-11387-00-00	5310	0.27	19.88
31-013-11387-00-00	5320	0.43	18.60
31-013-11387-00-00	5330	0.41	19.30
31-013-11387-00-00	5340	0.28	17.66
31-013-11387-00-00	5350	0.49	23.11
31-013-11387-00-00	5360	0.23	74.12
31-013-11387-00-00	5370	0.21	80.23
31-013-11387-00-00	5380	0.29	74.84
31-013-11387-00-00	5390	0.32	39.01
31-013-11387-00-00	5400	0.13	63.10
31-013-11387-00-00	5410	0.12	55.97
31-013-11387-00-00	5420	0.14	81.04
31-013-11387-00-00	5430	0.17	81.77
31-013-11387-00-00	5440	0.19	64.27
31-013-11387-00-00	5450	0.32	78.97
31-013-11387-00-00	5460	0.20	73.55
31-013-11387-00-00	5470	0.27	80.03
31-013-11387-00-00	5480	0.20	73.92
31-013-11387-00-00	5490	0.22	78.17
31-013-11387-00-00	5500	0.26	77.34
31-013-11387-00-00	5510	0.36	49.79
31-013-11387-00-00	5520	0.24	74.50
31-013-11387-00-00	5530	0.42	48.84
31-013-11387-00-00	5540	0.25	23.57
31-013-11387-00-00	5550	0.36	72.71
31-013-11387-00-00	5560	0.33	73.44
31-013-11387-00-00	5580	0.27	54.34
31-013-11387-00-00	5590	0.31	65.01
31-013-11387-00-00	5600	0.31	81.36
31-013-11387-00-00	5610	0.38	79.67
31-013-11387-00-00	5620	0.36	71.45
31-013-11387-00-00	5630	0.37	83.53
31-013-11387-00-00	5640	0.48	84.42
31-013-11387-00-00	5650	0.53	85.11
31-013-11387-00-00	5660	0.40	87.42
31-013-11387-00-00	5670	0.42	81.43
31-013-11387-00-00	5680	0.44	
31-013-11387-00-00	5690	0.49	77.97
31-013-11387-00-00	5700	0.34	82.39
31-013-11387-00-00	5710	0.33	90.27
31-013-11387-00-00	5720	0.36	76.61
31-013-11387-00-00	5730	0.49	78.28
31-013-11387-00-00	5740	0.41	71.66
Duplicates			
31-013-11387-00-00	5180-2	0.71	
31-013-11387-00-00	5350-2	0.46	
31-013-11387-00-00	5590-2	0.27	
31-013-11387-00-00	5740-2	0.42	



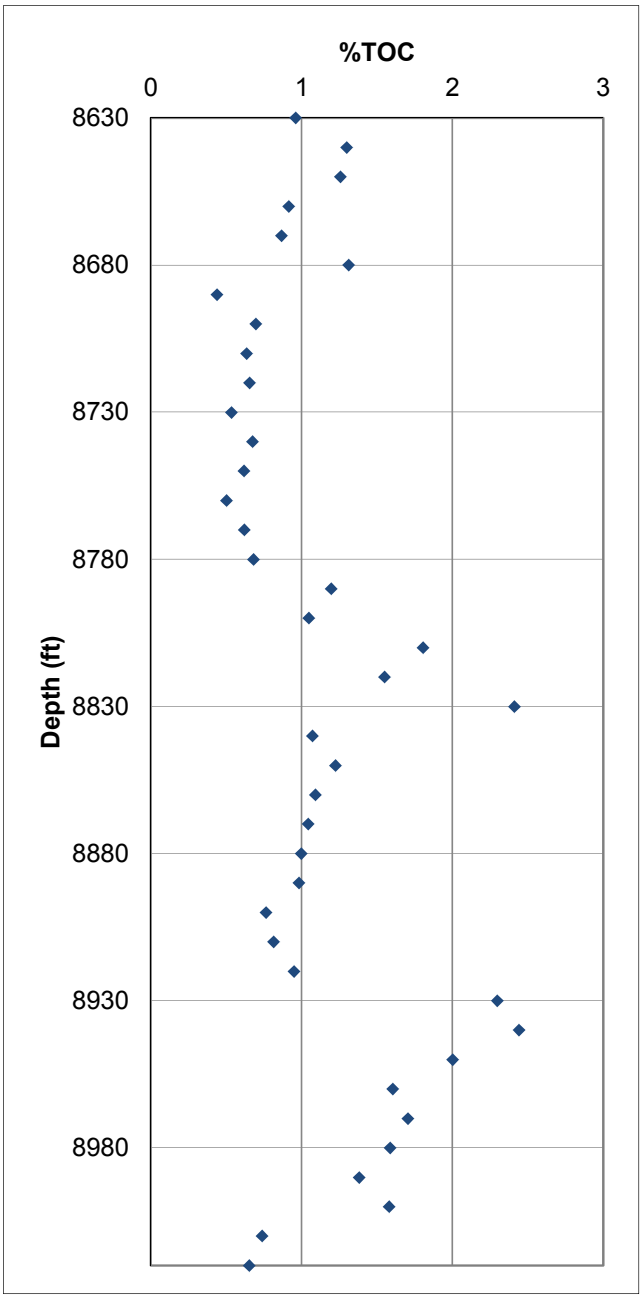
31-015-10335-00-00			
API	Depth (ft)	% TOC	Notes
31-015-10335-00-00	9775.0	0.37	Core
31-015-10335-00-00	9775.3	0.79	Core
31-015-10335-00-00	9775.6	0.40	Core
31-015-10335-00-00	9775.9	1.22	Core
31-015-10335-00-00	9776.0	1.11	Core
31-015-10335-00-00	9776.3	0.69	Core
31-015-10335-00-00	9776.5	1.34	Core
31-015-10335-00-00	9776.6	0.55	Core
31-015-10335-00-00	9776.9	1.16	Core
31-015-10335-00-00	9777.0	0.43	Core
31-015-10335-00-00	9777.3	0.97	Core
31-015-10335-00-00	9777.6	0.57	Core
31-015-10335-00-00	9777.9	0.61	Core
31-015-10335-00-00	9778.0	0.34	Core
31-015-10335-00-00	9778.3	0.41	Core
31-015-10335-00-00	9778.6	0.89	Core
31-015-10335-00-00	9778.9	0.39	Core
31-015-10335-00-00	9779.0	0.46	Core
31-015-10335-00-00	9779.3	1.11	Core
31-015-10335-00-00	9779.6	0.55	Core
31-015-10335-00-00	9779.9	0.33	Core
31-015-10335-00-00	9780.0	1.56	Core
31-015-10335-00-00	9780.3	0.67	Core
31-015-10335-00-00	9780.6	1.36	Core
31-015-10335-00-00	9780.9	0.56	Core
31-015-10335-00-00	9781.0	0.63	Core
31-015-10335-00-00	9781.3	0.98	Core
31-015-10335-00-00	9781.6	0.59	Core
31-015-10335-00-00	9781.9	1.96	Core
31-015-10335-00-00	9782.0	0.90	Core
31-015-10335-00-00	9782.3	1.86	Core
31-015-10335-00-00	9782.6	0.75	Core
31-015-10335-00-00	9782.9	0.45	Core
31-015-10335-00-00	9783.0	0.49	Core
31-015-10335-00-00	9783.1	1.19	Core
31-015-10335-00-00	9783.3	0.42	Core
31-015-10335-00-00	9783.6	0.43	Core
31-015-10335-00-00	9783.9	1.24	Core
31-015-10335-00-00	9784.0	0.51	Core
31-015-10335-00-00	9784.1	1.24	Core
31-015-10335-00-00	9784.3	0.63	Core
31-015-10335-00-00	9784.6	0.33	Core
31-015-10335-00-00	9784.8	0.95	Core
31-015-10335-00-00	9784.9	0.43	Core
31-015-10335-00-00	9785.0	0.51	Core
31-015-10335-00-00	9785.3	0.37	Core
31-015-10335-00-00	9785.6	1.17	Core
31-015-10335-00-00	9785.9	0.58	Core
31-015-10335-00-00	9786.0	1.32	Core
31-015-10335-00-00	9786.3	0.57	Core
31-015-10335-00-00	9786.9	1.82	Core
31-015-10335-00-00	9787.0	1.94	Core
31-015-10335-00-00	9787.3	0.72	Core
31-015-10335-00-00	9787.6	2.52	Core
31-015-10335-00-00	9787.9	0.90	Core
31-015-10335-00-00	9788.0	0.73	Core
31-015-10335-00-00	9788.3	0.58	Core
31-015-10335-00-00	9788.6	1.24	Core
31-015-10335-00-00	9788.9	0.73	Core
31-015-10335-00-00	9789.0	3.07	Core
Duplicates			
31-015-10335-00-00	9775.9-2	1.33	
31-015-10335-00-00	9777.3-2	0.97	
31-015-10335-00-00	9781.9-2	2.02	
31-015-10335-00-00	9784.3-2	0.63	
31-015-10335-00-00	9785.6-2	1.17	



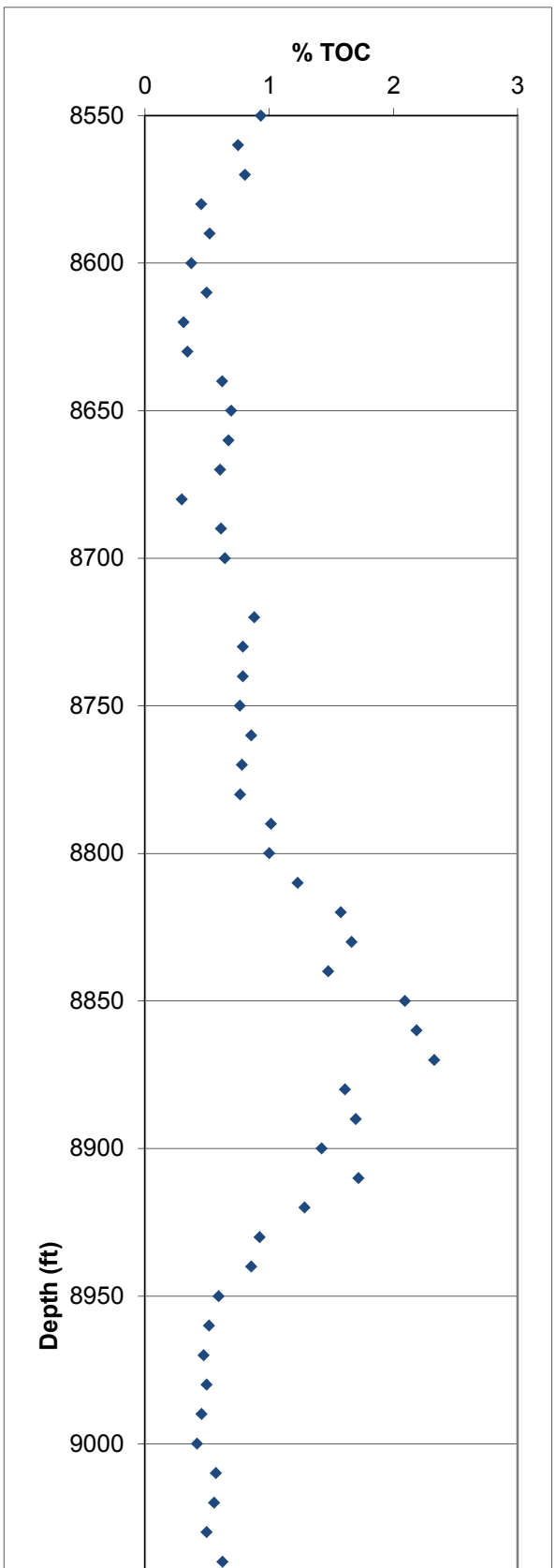
31-015-10335-00-00			
API	Depth (ft)	% TOC	Notes
31-015-10335-00-00	9280	1.85	Cuttings
31-015-10335-00-00	9290	1.96	Cuttings
31-015-10335-00-00	9295	1.95	Cuttings
31-015-10335-00-00	9300	2.61	Cuttings
31-015-10335-00-00	9310	2.05	Cuttings
31-015-10335-00-00	9320	2.21	Cuttings
31-015-10335-00-00	9330	1.34	Cuttings
31-015-10335-00-00	9340	1.00	Cuttings
31-015-10335-00-00	9350	0.82	Cuttings
31-015-10335-00-00	9360	0.72	Cuttings
31-015-10335-00-00	9370	0.95	Cuttings
31-015-10335-00-00	9380	1.38	Cuttings
31-015-10335-00-00	9390	1.30	Cuttings
31-015-10335-00-00	9400	1.35	Cuttings
31-015-10335-00-00	9410	1.31	Cuttings
31-015-10335-00-00	9420	1.82	Cuttings
31-015-10335-00-00	9430	1.92	Cuttings
31-015-10335-00-00	9440	1.81	Cuttings
31-015-10335-00-00	9450	1.81	Cuttings
31-015-10335-00-00	9460	1.77	Cuttings
31-015-10335-00-00	9470	1.80	Cuttings
31-015-10335-00-00	9480	1.82	Cuttings
31-015-10335-00-00	9490	1.52	Cuttings
31-015-10335-00-00	9500	1.22	Cuttings
31-015-10335-00-00	9510	1.00	Cuttings
31-015-10335-00-00	9520	0.77	Cuttings
31-015-10335-00-00	9530	0.84	Cuttings
31-015-10335-00-00	9540	0.51	Cuttings
Duplicates			
31-015-10335-00-00	9300-2	2.56	
31-015-10335-00-00	9400-2	1.37	
31-015-10335-00-00	9500-2	1.23	



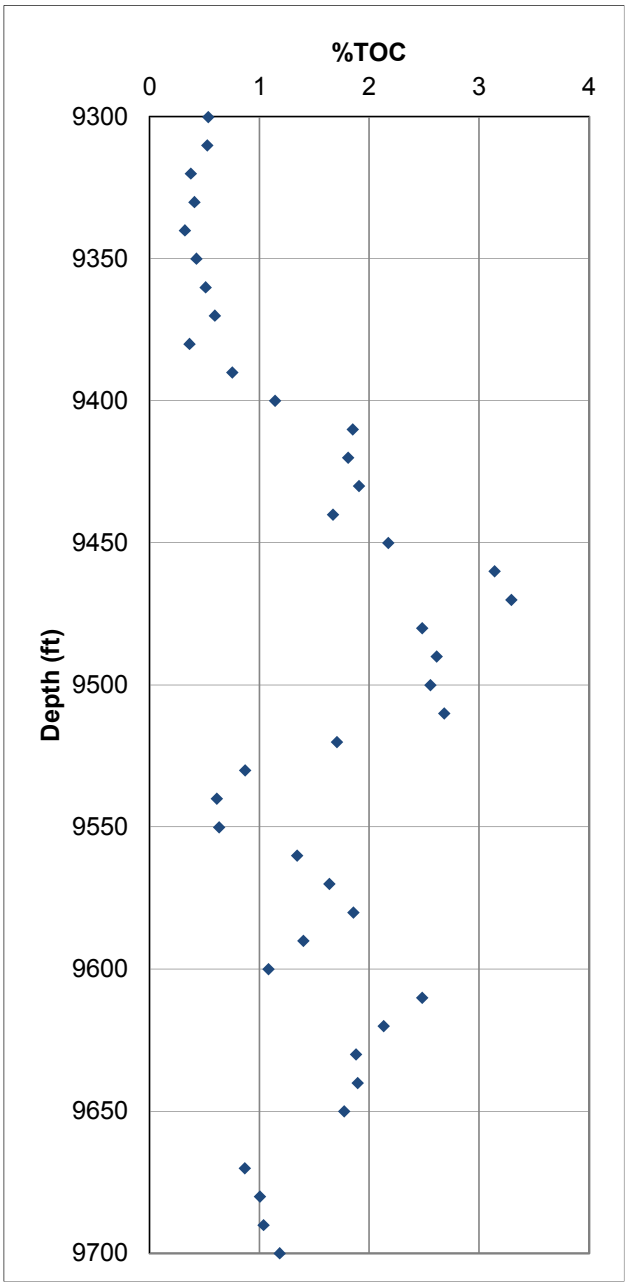
31-015-22902-00-00		
API	Depth (ft)	%TOC
31-015-22902-00-00	8630	0.96
31-015-22902-00-00	8640	1.30
31-015-22902-00-00	8650	1.26
31-015-22902-00-00	8660	0.91
31-015-22902-00-00	8670	0.87
31-015-22902-00-00	8680	1.31
31-015-22902-00-00	8690	0.44
31-015-22902-00-00	8700	0.69
31-015-22902-00-00	8710	0.64
31-015-22902-00-00	8720	0.65
31-015-22902-00-00	8730	0.53
31-015-22902-00-00	8740	0.67
31-015-22902-00-00	8750	0.62
31-015-22902-00-00	8760	0.50
31-015-22902-00-00	8770	0.62
31-015-22902-00-00	8780	0.68
31-015-22902-00-00	8790	1.20
31-015-22902-00-00	8800	1.05
31-015-22902-00-00	8810	1.80
31-015-22902-00-00	8820	1.55
31-015-22902-00-00	8830	2.41
31-015-22902-00-00	8840	1.07
31-015-22902-00-00	8850	1.22
31-015-22902-00-00	8860	1.09
31-015-22902-00-00	8870	1.04
31-015-22902-00-00	8880	1.00
31-015-22902-00-00	8890	0.98
31-015-22902-00-00	8900	0.76
31-015-22902-00-00	8910	0.81
31-015-22902-00-00	8920	0.95
31-015-22902-00-00	8930	2.30
31-015-22902-00-00	8940	2.44
31-015-22902-00-00	8950	2.00
31-015-22902-00-00	8960	1.60
31-015-22902-00-00	8970	1.70
31-015-22902-00-00	8980	1.59
31-015-22902-00-00	8990	1.38
31-015-22902-00-00	9000	1.58
31-015-22902-00-00	9010	0.74
31-015-22902-00-00	9020	0.65
Duplicates		
31-015-22902-00-00	8990-2	1.36
31-015-22902-00-00	8700-2	0.73



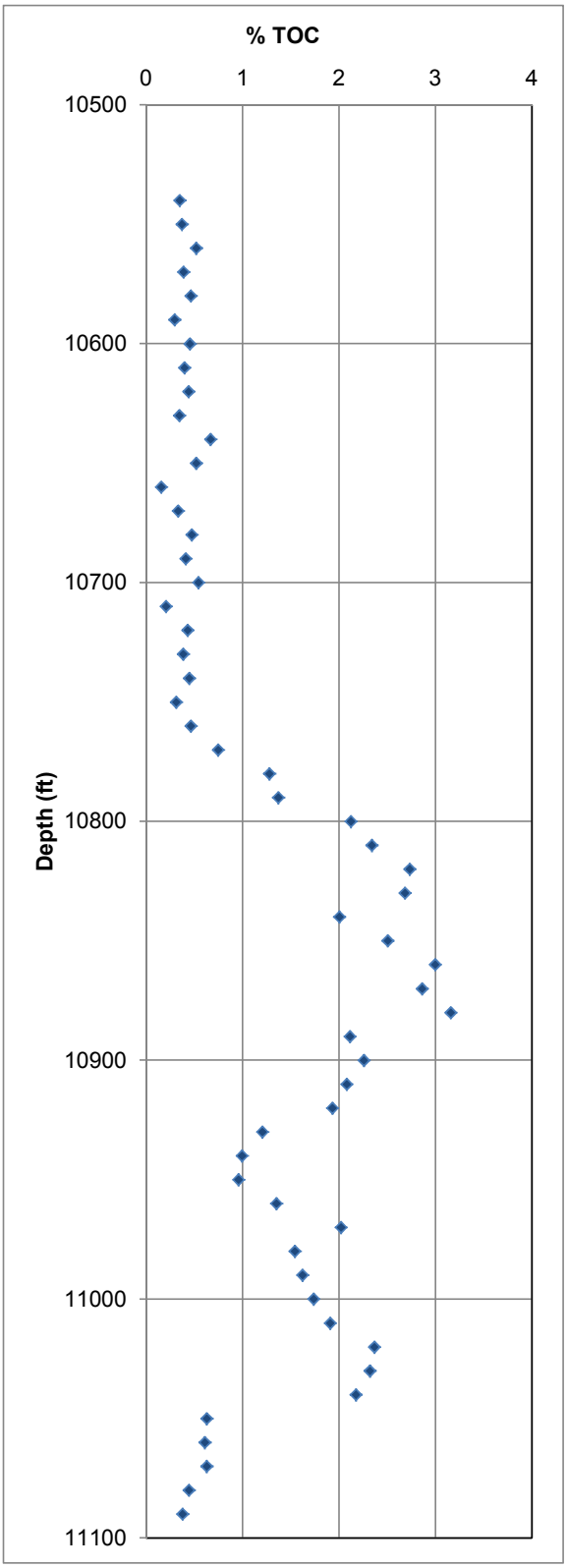
31-015-22975-00-00		
API	Depth (ft)	% TOC
31-015-22975-00-00	8550	0.93
31-015-22975-00-00	8560	0.75
31-015-22975-00-00	8570	0.80
31-015-22975-00-00	8580	0.45
31-015-22975-00-00	8590	0.52
31-015-22975-00-00	8600	0.37
31-015-22975-00-00	8610	0.49
31-015-22975-00-00	8620	0.31
31-015-22975-00-00	8630	0.34
31-015-22975-00-00	8640	0.62
31-015-22975-00-00	8650	0.69
31-015-22975-00-00	8660	0.67
31-015-22975-00-00	8670	0.60
31-015-22975-00-00	8680	0.29
31-015-22975-00-00	8690	0.61
31-015-22975-00-00	8700	0.64
31-015-22975-00-00	8720	0.88
31-015-22975-00-00	8730	0.79
31-015-22975-00-00	8740	0.79
31-015-22975-00-00	8750	0.76
31-015-22975-00-00	8760	0.85
31-015-22975-00-00	8770	0.78
31-015-22975-00-00	8780	0.77
31-015-22975-00-00	8790	1.01
31-015-22975-00-00	8800	1.00
31-015-22975-00-00	8810	1.23
31-015-22975-00-00	8820	1.57
31-015-22975-00-00	8830	1.66
31-015-22975-00-00	8840	1.47
31-015-22975-00-00	8850	2.09
31-015-22975-00-00	8860	2.19
31-015-22975-00-00	8870	2.33
31-015-22975-00-00	8880	1.61
31-015-22975-00-00	8890	1.69
31-015-22975-00-00	8900	1.42
31-015-22975-00-00	8910	1.72
31-015-22975-00-00	8920	1.28
31-015-22975-00-00	8930	0.92
31-015-22975-00-00	8940	0.85
31-015-22975-00-00	8950	0.59
31-015-22975-00-00	8960	0.51
31-015-22975-00-00	8970	0.47
31-015-22975-00-00	8980	0.49
31-015-22975-00-00	8990	0.45
31-015-22975-00-00	9000	0.42
31-015-22975-00-00	9010	0.57
31-015-22975-00-00	9020	0.55
31-015-22975-00-00	9030	0.50
31-015-22975-00-00	9040	0.62
31-015-22975-00-00	9050	0.64
31-015-22975-00-00	9060	0.56
31-015-22975-00-00	9070	0.72
31-015-22975-00-00	9080	0.57
31-015-22975-00-00	9090	0.50
31-015-22975-00-00	9100	0.43
31-015-22975-00-00	9110	0.39
31-015-22975-00-00	9120	0.51
31-015-22975-00-00	9130	0.48
31-015-22975-00-00	9140	0.68
31-015-22975-00-00	9150	0.91
31-015-22975-00-00	9160	0.86
31-015-22975-00-00	9170	0.70
31-015-22975-00-00	9180	0.53
31-015-22975-00-00	9190	0.28
31-015-22975-00-00	9200	0.26
31-015-22975-00-00	9210	0.45
31-015-22975-00-00	9220	0.50
31-015-22975-00-00	9230	0.46
31-015-22975-00-00	9240	0.55
31-015-22975-00-00	9250	0.39
31-015-22975-00-00	9260	0.39
31-015-22975-00-00	9270	0.38
31-015-22975-00-00	9280	0.45
31-015-22975-00-00	9290	0.89
31-015-22975-00-00	9300	0.82
31-015-22975-00-00	9310	0.73
31-015-22975-00-00	9320	0.36
31-015-22975-00-00	9330	0.40
31-015-22975-00-00	9340	0.35
31-015-22975-00-00	9350	0.24
Duplicates		
31-015-22975-00-00	8610-2	0.53
31-015-22975-00-00	8850-2	2.18
31-015-22975-00-00	9870-2	0.50
31-015-22975-00-00	9200-2	0.26



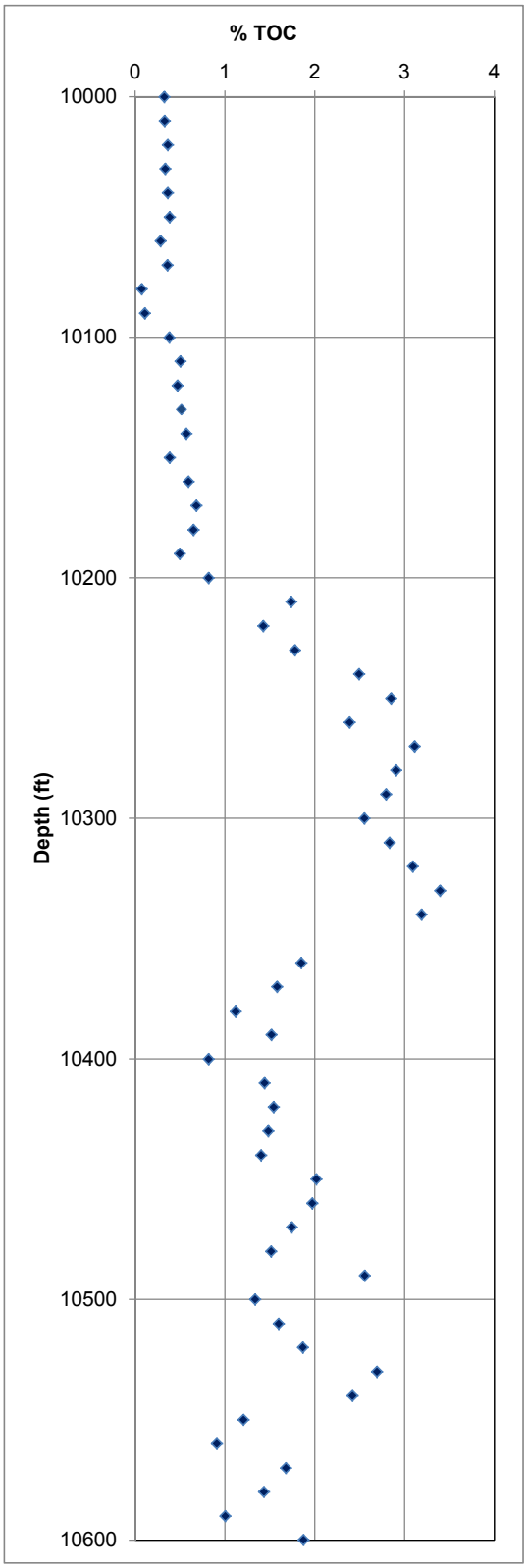
31-015-23023-00-00		
API	Depth (ft)	% TOC
31-015-23023-00-00	9300	0.53
31-015-23023-00-00	9310	0.52
31-015-23023-00-00	9320	0.38
31-015-23023-00-00	9330	0.41
31-015-23023-00-00	9340	0.32
31-015-23023-00-00	9350	0.42
31-015-23023-00-00	9360	0.51
31-015-23023-00-00	9370	0.59
31-015-23023-00-00	9380	0.36
31-015-23023-00-00	9390	0.75
31-015-23023-00-00	9400	1.14
31-015-23023-00-00	9410	1.85
31-015-23023-00-00	9420	1.81
31-015-23023-00-00	9430	1.90
31-015-23023-00-00	9440	1.67
31-015-23023-00-00	9450	2.17
31-015-23023-00-00	9460	3.14
31-015-23023-00-00	9470	3.29
31-015-23023-00-00	9480	2.48
31-015-23023-00-00	9490	2.61
31-015-23023-00-00	9500	2.55
31-015-23023-00-00	9510	2.68
31-015-23023-00-00	9520	1.70
31-015-23023-00-00	9530	0.87
31-015-23023-00-00	9540	0.61
31-015-23023-00-00	9550	0.63
31-015-23023-00-00	9560	1.34
31-015-23023-00-00	9570	1.64
31-015-23023-00-00	9580	1.85
31-015-23023-00-00	9590	1.40
31-015-23023-00-00	9600	1.08
31-015-23023-00-00	9610	2.48
31-015-23023-00-00	9620	2.13
31-015-23023-00-00	9630	1.88
31-015-23023-00-00	9640	1.89
31-015-23023-00-00	9650	1.77
31-015-23023-00-00	9670	0.87
31-015-23023-00-00	9680	1.00
31-015-23023-00-00	9690	1.04
31-015-23023-00-00	9700	1.18
Duplicates		
31-015-23023-00-00	9570-2	1.63
31-015-23023-00-00	9700-2	1.30



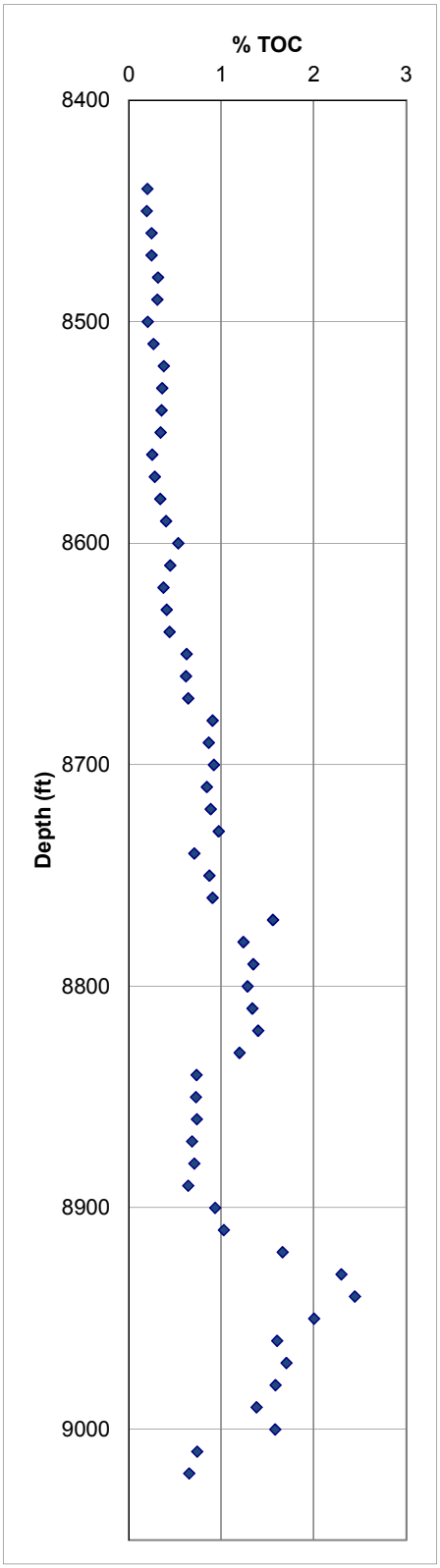
31-015-23114-00-00		
API	Depth (ft)	% TOC
31-015-23114-00-00	10540	0.35
31-015-23114-00-00	10550	0.37
31-015-23114-00-00	10560	0.52
31-015-23114-00-00	10570	0.39
31-015-23114-00-00	10580	0.46
31-015-23114-00-00	10590	0.30
31-015-23114-00-00	10600	0.45
31-015-23114-00-00	10610	0.40
31-015-23114-00-00	10620	0.44
31-015-23114-00-00	10630	0.34
31-015-23114-00-00	10640	0.67
31-015-23114-00-00	10650	0.52
31-015-23114-00-00	10660	0.15
31-015-23114-00-00	10670	0.33
31-015-23114-00-00	10680	0.47
31-015-23114-00-00	10690	0.41
31-015-23114-00-00	10700	0.54
31-015-23114-00-00	10710	0.21
31-015-23114-00-00	10720	0.43
31-015-23114-00-00	10730	0.38
31-015-23114-00-00	10740	0.44
31-015-23114-00-00	10750	0.31
31-015-23114-00-00	10760	0.46
31-015-23114-00-00	10770	0.75
31-015-23114-00-00	10780	1.28
31-015-23114-00-00	10790	1.37
31-015-23114-00-00	10800	2.12
31-015-23114-00-00	10810	2.34
31-015-23114-00-00	10820	2.73
31-015-23114-00-00	10830	2.68
31-015-23114-00-00	10840	2.00
31-015-23114-00-00	10850	2.51
31-015-23114-00-00	10860	3.00
31-015-23114-00-00	10870	2.86
31-015-23114-00-00	10880	3.16
31-015-23114-00-00	10890	2.11
31-015-23114-00-00	10900	2.26
31-015-23114-00-00	10910	2.08
31-015-23114-00-00	10920	1.93
31-015-23114-00-00	10930	1.20
31-015-23114-00-00	10940	0.99
31-015-23114-00-00	10950	0.96
31-015-23114-00-00	10960	1.35
31-015-23114-00-00	10970	2.02
31-015-23114-00-00	10980	1.54
31-015-23114-00-00	10990	1.62
31-015-23114-00-00	11000	1.74
31-015-23114-00-00	11010	1.91
31-015-23114-00-00	11020	2.37
31-015-23114-00-00	11030	2.32
31-015-23114-00-00	11040	2.18
31-015-23114-00-00	11050	0.63
31-015-23114-00-00	11060	0.61
31-015-23114-00-00	11070	0.63
31-015-23114-00-00	11080	0.44
31-015-23114-00-00	11090	0.38
Duplicates		
31-015-23114-00-00	10610-2	0.46
31-015-23114-00-00	10850-2	2.57
31-015-23114-00-00	10980-2	1.63



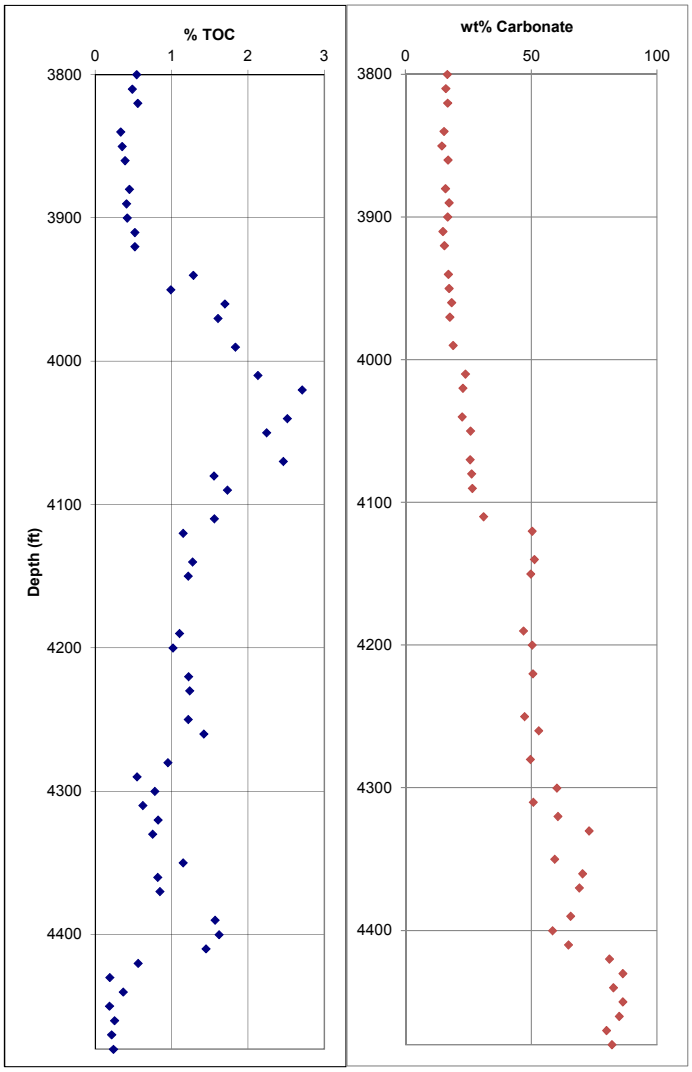
31-015-23186-00-00		
API	Depth (ft)	% TOC
31-015-23186-00-00	10000	0.32
31-015-23186-00-00	10010	0.33
31-015-23186-00-00	10020	0.36
31-015-23186-00-00	10030	0.34
31-015-23186-00-00	10040	0.36
31-015-23186-00-00	10050	0.39
31-015-23186-00-00	10060	0.28
31-015-23186-00-00	10070	0.36
31-015-23186-00-00	10080	0.07
31-015-23186-00-00	10090	0.11
31-015-23186-00-00	10100	0.38
31-015-23186-00-00	10110	0.50
31-015-23186-00-00	10120	0.47
31-015-23186-00-00	10130	0.51
31-015-23186-00-00	10140	0.57
31-015-23186-00-00	10150	0.38
31-015-23186-00-00	10160	0.60
31-015-23186-00-00	10170	0.68
31-015-23186-00-00	10180	0.65
31-015-23186-00-00	10190	0.50
31-015-23186-00-00	10200	0.82
31-015-23186-00-00	10210	1.74
31-015-23186-00-00	10220	1.43
31-015-23186-00-00	10230	1.78
31-015-23186-00-00	10240	2.49
31-015-23186-00-00	10250	2.85
31-015-23186-00-00	10260	2.39
31-015-23186-00-00	10270	3.11
31-015-23186-00-00	10280	2.90
31-015-23186-00-00	10290	2.80
31-015-23186-00-00	10300	2.55
31-015-23186-00-00	10310	2.83
31-015-23186-00-00	10320	3.09
31-015-23186-00-00	10330	3.40
31-015-23186-00-00	10340	3.19
31-015-23186-00-00	10350	
31-015-23186-00-00	10360	1.85
31-015-23186-00-00	10370	1.58
31-015-23186-00-00	10380	1.12
31-015-23186-00-00	10390	1.52
31-015-23186-00-00	10400	0.82
31-015-23186-00-00	10410	1.44
31-015-23186-00-00	10420	1.54
31-015-23186-00-00	10430	1.48
31-015-23186-00-00	10440	1.40
31-015-23186-00-00	10450	2.02
31-015-23186-00-00	10460	1.97
31-015-23186-00-00	10470	1.75
31-015-23186-00-00	10480	1.52
31-015-23186-00-00	10490	2.55
31-015-23186-00-00	10500	1.33
31-015-23186-00-00	10510	1.60
31-015-23186-00-00	10520	1.87
31-015-23186-00-00	10530	2.69
31-015-23186-00-00	10540	2.42
31-015-23186-00-00	10550	1.21
31-015-23186-00-00	10560	0.91
31-015-23186-00-00	10570	1.68
31-015-23186-00-00	10580	1.43
31-015-23186-00-00	10590	1.00
31-015-23186-00-00	10600	1.87
Duplicates		
31-015-23186-00-00	10070-2	0.35
31-015-23186-00-00	10160-2	0.67
31-015-23186-00-00	10380-2	1.07



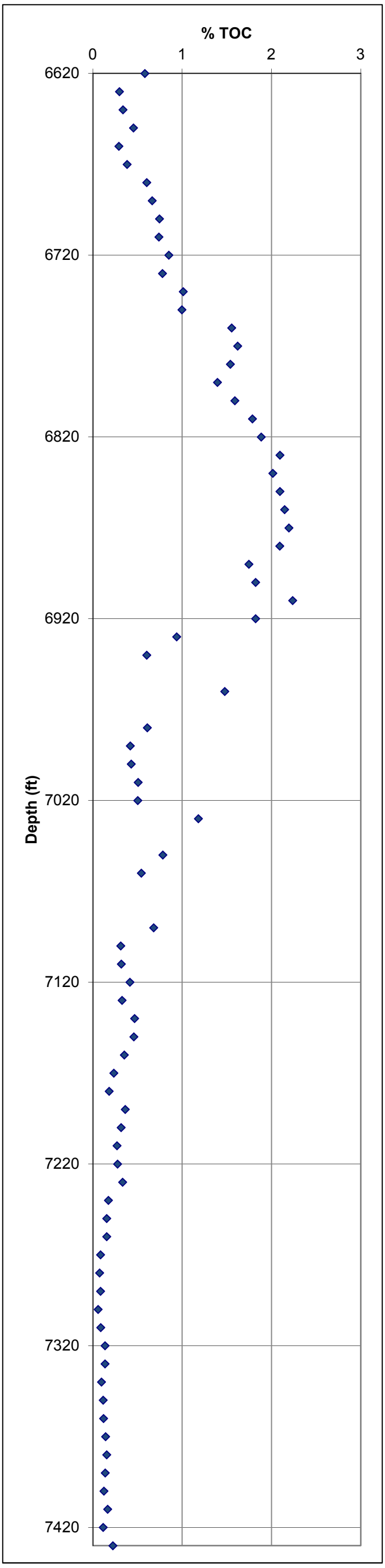
31-015-23200-00-00		
API	Depth (ft)	% TOC
31-015-23200-00-00	8440	0.20
31-015-23200-00-00	8450	0.20
31-015-23200-00-00	8460	0.25
31-015-23200-00-00	8470	0.25
31-015-23200-00-00	8480	0.32
31-015-23200-00-00	8490	0.31
31-015-23200-00-00	8500	0.21
31-015-23200-00-00	8510	0.27
31-015-23200-00-00	8520	0.38
31-015-23200-00-00	8530	0.36
31-015-23200-00-00	8540	0.35
31-015-23200-00-00	8550	0.34
31-015-23200-00-00	8560	0.25
31-015-23200-00-00	8570	0.28
31-015-23200-00-00	8580	0.34
31-015-23200-00-00	8590	0.40
31-015-23200-00-00	8600	0.53
31-015-23200-00-00	8610	0.45
31-015-23200-00-00	8620	0.37
31-015-23200-00-00	8630	0.41
31-015-23200-00-00	8640	0.44
31-015-23200-00-00	8650	0.62
31-015-23200-00-00	8660	0.62
31-015-23200-00-00	8670	0.64
31-015-23200-00-00	8680	0.90
31-015-23200-00-00	8690	0.87
31-015-23200-00-00	8700	0.92
31-015-23200-00-00	8710	0.84
31-015-23200-00-00	8720	0.89
31-015-23200-00-00	8730	0.97
31-015-23200-00-00	8740	0.71
31-015-23200-00-00	8750	0.87
31-015-23200-00-00	8760	0.91
31-015-23200-00-00	8770	1.56
31-015-23200-00-00	8780	1.24
31-015-23200-00-00	8790	1.35
31-015-23200-00-00	8800	1.28
31-015-23200-00-00	8810	1.34
31-015-23200-00-00	8820	1.40
31-015-23200-00-00	8830	1.20
31-015-23200-00-00	8840	0.73
31-015-23200-00-00	8850	0.73
31-015-23200-00-00	8860	0.74
31-015-23200-00-00	8870	0.68
31-015-23200-00-00	8880	0.71
31-015-23200-00-00	8890	0.64
31-015-23200-00-00	8900	0.93
31-015-23200-00-00	8910	1.03
31-015-23200-00-00	8920	1.66
31-015-23200-00-00	8930	2.30
31-015-23200-00-00	8940	2.44
31-015-23200-00-00	8950	2.00
31-015-23200-00-00	8960	1.60
31-015-23200-00-00	8970	1.70
31-015-23200-00-00	8980	1.59
31-015-23200-00-00	8990	1.38
31-015-23200-00-00	9000	1.58
31-015-23200-00-00	9010	0.74
31-015-23200-00-00	9020	0.65
Duplicates		
31-015-23200-00-00	8510-2	0.30
31-015-23200-00-00	8750-2	0.93
31-015-23200-00-00	8990-2	1.36



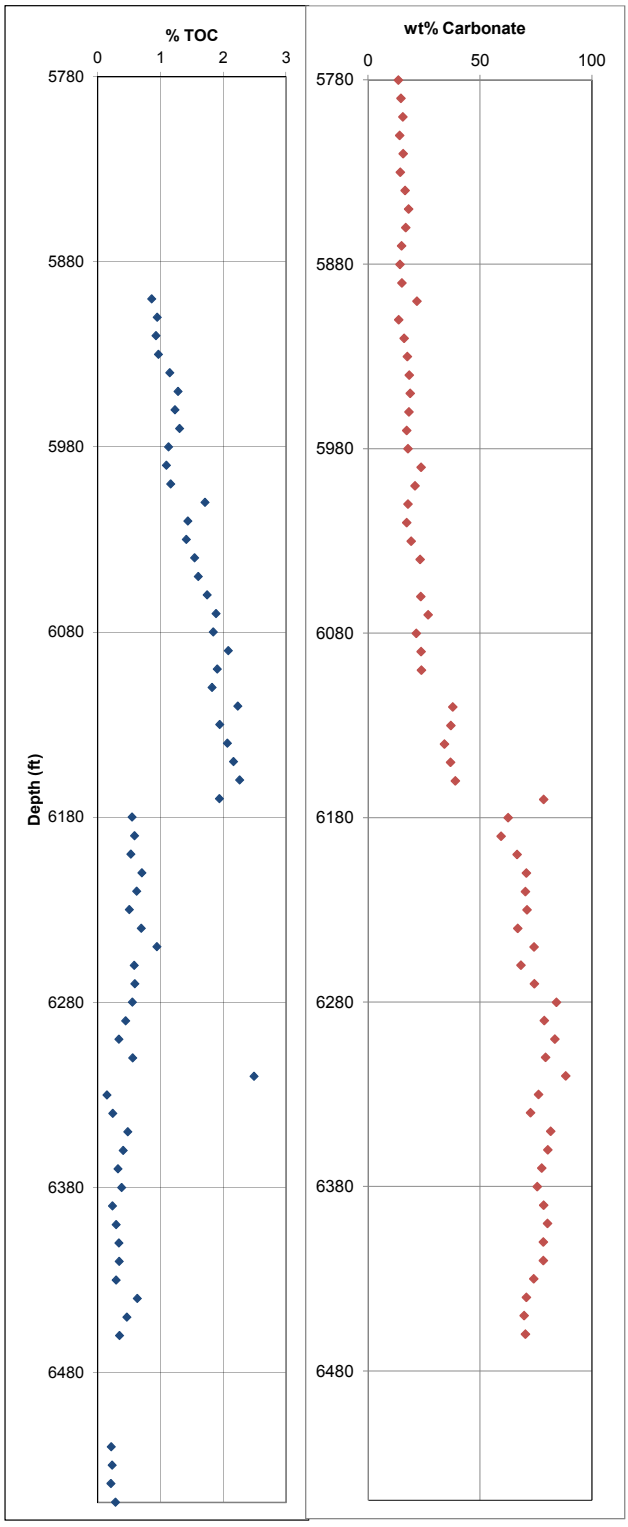
31-017-01160-00-00			
API	Depth (ft)	% TOC	wt% Carbonate
31-017-01160-00-00	3800	0.54	16.51
31-017-01160-00-00	3810	0.48	15.93
31-017-01160-00-00	3820	0.56	16.64
31-017-01160-00-00	3840	0.33	15.22
31-017-01160-00-00	3850	0.35	14.37
31-017-01160-00-00	3860	0.39	16.84
31-017-01160-00-00	3880	0.44	15.76
31-017-01160-00-00	3890	0.41	17.28
31-017-01160-00-00	3900	0.42	16.74
31-017-01160-00-00	3910	0.52	14.80
31-017-01160-00-00	3920	0.52	15.43
31-017-01160-00-00	3940	1.28	16.90
31-017-01160-00-00	3950	0.99	17.31
31-017-01160-00-00	3960	1.70	18.33
31-017-01160-00-00	3970	1.61	17.51
31-017-01160-00-00	3990	1.83	18.90
31-017-01160-00-00	4010	2.13	23.75
31-017-01160-00-00	4020	2.71	22.80
31-017-01160-00-00	4040	2.52	22.39
31-017-01160-00-00	4050	2.25	25.83
31-017-01160-00-00	4070	2.46	25.66
31-017-01160-00-00	4080	1.56	26.23
31-017-01160-00-00	4090	1.73	26.43
31-017-01160-00-00	4110	1.56	30.98
31-017-01160-00-00	4120	1.15	50.33
31-017-01160-00-00	4140	1.27	51.21
31-017-01160-00-00	4150	1.22	49.67
31-017-01160-00-00	4190	1.10	46.78
31-017-01160-00-00	4200	1.02	50.26
31-017-01160-00-00	4220	1.22	50.64
31-017-01160-00-00	4230	1.23	
31-017-01160-00-00	4250	1.22	47.32
31-017-01160-00-00	4260	1.42	52.90
31-017-01160-00-00	4280	0.95	49.52
31-017-01160-00-00	4290	0.54	
31-017-01160-00-00	4300	0.78	60.15
31-017-01160-00-00	4310	0.62	50.69
31-017-01160-00-00	4320	0.82	60.57
31-017-01160-00-00	4330	0.75	72.90
31-017-01160-00-00	4350	1.15	59.30
31-017-01160-00-00	4360	0.82	70.33
31-017-01160-00-00	4370	0.84	68.99
31-017-01160-00-00	4390	1.57	65.65
31-017-01160-00-00	4400	1.62	58.41
31-017-01160-00-00	4410	1.45	64.72
31-017-01160-00-00	4420	0.56	80.96
31-017-01160-00-00	4430	0.19	86.41
31-017-01160-00-00	4440	0.37	82.63
31-017-01160-00-00	4450	0.19	86.29
31-017-01160-00-00	4460	0.25	84.85
31-017-01160-00-00	4470	0.21	79.93
31-017-01160-00-00	4480	0.24	82.07
Duplicates			
31-017-01160-00-00	3850-2	0.40	
31-017-01160-00-00	4200-2	1.18	
31-017-01160-00-00	4370-2	0.87	



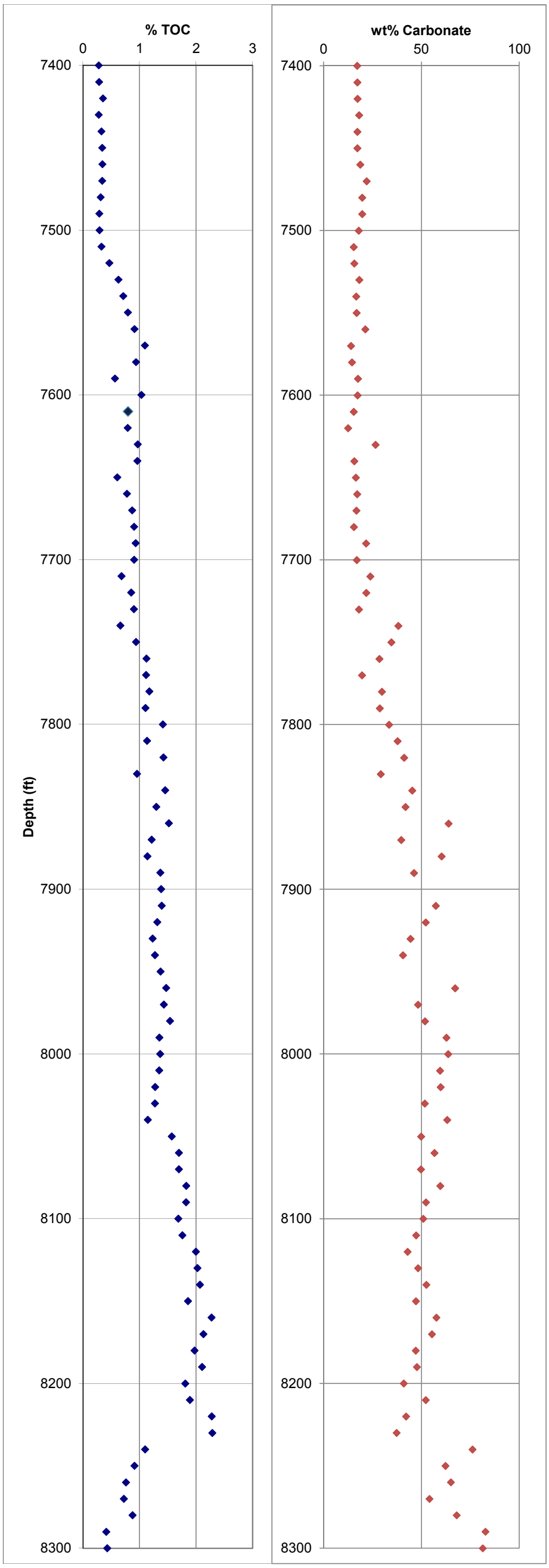
31-023-04714-00-00		
API	Depth (ft)	%TOC
31-023-04714-00-00	6620	0.58
31-023-04714-00-00	6630	0.30
31-023-04714-00-00	6640	0.34
31-023-04714-00-00	6650	0.46
31-023-04714-00-00	6660	0.29
31-023-04714-00-00	6670	0.39
31-023-04714-00-00	6680	0.60
31-023-04714-00-00	6690	0.67
31-023-04714-00-00	6700	0.75
31-023-04714-00-00	6710	0.74
31-023-04714-00-00	6720	0.85
31-023-04714-00-00	6730	0.78
31-023-04714-00-00	6740	1.01
31-023-04714-00-00	6750	1.00
31-023-04714-00-00	6760	1.56
31-023-04714-00-00	6770	1.62
31-023-04714-00-00	6780	1.54
31-023-04714-00-00	6790	1.40
31-023-04714-00-00	6800	1.59
31-023-04714-00-00	6810	1.79
31-023-04714-00-00	6820	1.89
31-023-04714-00-00	6830	2.10
31-023-04714-00-00	6840	2.02
31-023-04714-00-00	6850	2.10
31-023-04714-00-00	6860	2.15
31-023-04714-00-00	6870	2.20
31-023-04714-00-00	6880	2.09
31-023-04714-00-00	6890	1.75
31-023-04714-00-00	6900	1.82
31-023-04714-00-00	6910	2.24
31-023-04714-00-00	6920	1.82
31-023-04714-00-00	6930	0.94
31-023-04714-00-00	6940	0.61
31-023-04714-00-00	6960	1.48
31-023-04714-00-00	6980	0.61
31-023-04714-00-00	6990	0.42
31-023-04714-00-00	7000	0.43
31-023-04714-00-00	7010	0.51
31-023-04714-00-00	7020	0.50
31-023-04714-00-00	7030	1.18
31-023-04714-00-00	7050	0.79
31-023-04714-00-00	7060	0.54
31-023-04714-00-00	7090	0.68
31-023-04714-00-00	7100	0.31
31-023-04714-00-00	7110	0.32
31-023-04714-00-00	7120	0.41
31-023-04714-00-00	7130	0.33
31-023-04714-00-00	7140	0.47
31-023-04714-00-00	7150	0.46
31-023-04714-00-00	7160	0.35
31-023-04714-00-00	7170	0.24
31-023-04714-00-00	7180	0.18
31-023-04714-00-00	7190	0.36
31-023-04714-00-00	7200	0.32
31-023-04714-00-00	7210	0.27
31-023-04714-00-00	7220	0.28
31-023-04714-00-00	7230	0.33
31-023-04714-00-00	7240	0.17
31-023-04714-00-00	7250	0.16
31-023-04714-00-00	7260	0.16
31-023-04714-00-00	7270	0.09
31-023-04714-00-00	7280	0.08
31-023-04714-00-00	7290	0.09
31-023-04714-00-00	7300	0.06
31-023-04714-00-00	7310	0.09
31-023-04714-00-00	7320	0.14
31-023-04714-00-00	7330	0.14
31-023-04714-00-00	7340	0.10
31-023-04714-00-00	7350	0.12
31-023-04714-00-00	7360	0.12
31-023-04714-00-00	7370	0.14
31-023-04714-00-00	7380	0.16
31-023-04714-00-00	7390	0.14
31-023-04714-00-00	7400	0.13
31-023-04714-00-00	7410	0.17
31-023-04714-00-00	7420	0.12
31-023-04714-00-00	7430	0.22
Duplicates		
31-023-04714-00-00	6790-2	1.46
31-023-04714-00-00	6900-2	1.68
31-023-04714-00-00	7220-2	0.28
31-023-04714-00-00	7340-2	0.09



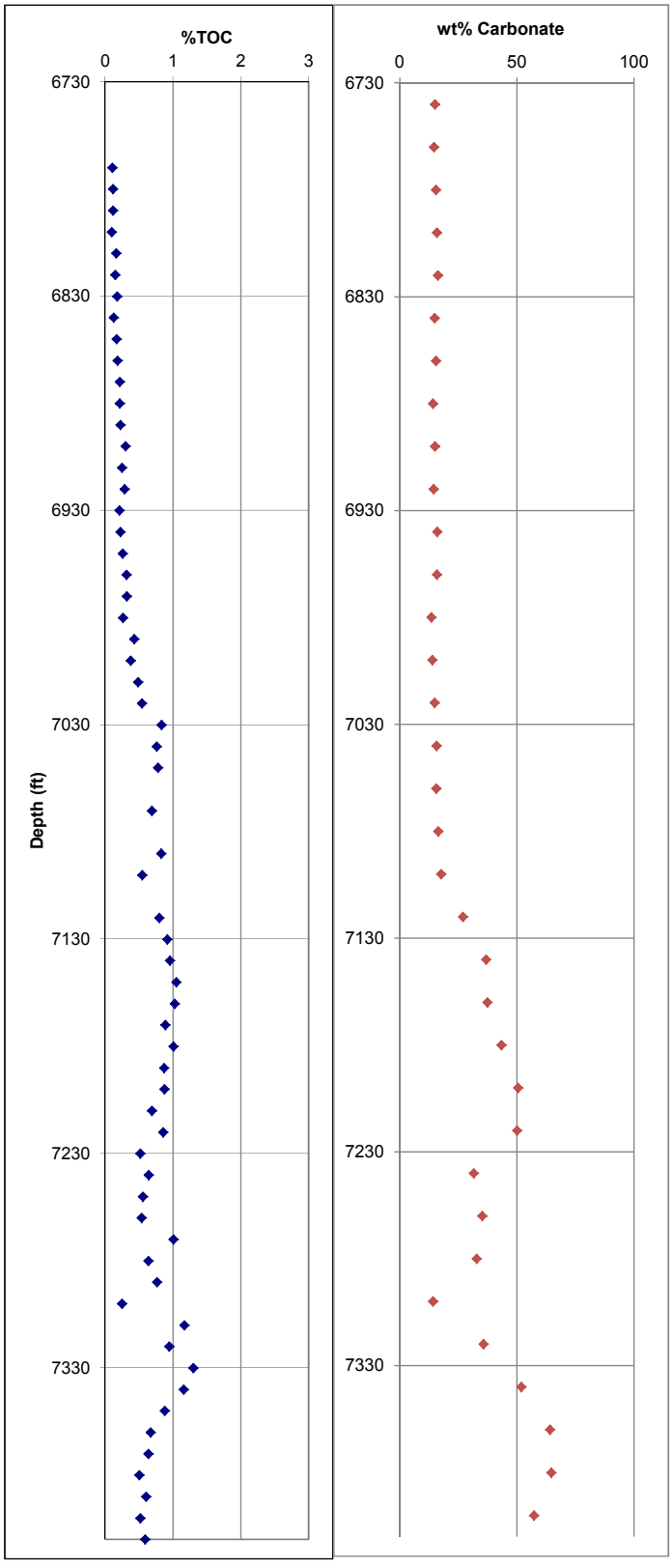
31-023-21500-00-00			
API	Depth (ft)	% TOC	wt% Carbonate
31-023-21500-00-00	5780		13.51
31-023-21500-00-00	5790		14.60
31-023-21500-00-00	5800		15.52
31-023-21500-00-00	5810		14.09
31-023-21500-00-00	5820		15.69
31-023-21500-00-00	5830		14.37
31-023-21500-00-00	5840		16.44
31-023-21500-00-00	5850		18.02
31-023-21500-00-00	5860		16.72
31-023-21500-00-00	5870		14.95
31-023-21500-00-00	5880		14.19
31-023-21500-00-00	5890		15.10
31-023-21500-00-00	5900	0.86	21.72
31-023-21500-00-00	5910	0.95	13.61
31-023-21500-00-00	5920	0.93	16.02
31-023-21500-00-00	5930	0.97	17.53
31-023-21500-00-00	5940	1.15	18.30
31-023-21500-00-00	5950	1.28	18.84
31-023-21500-00-00	5960	1.23	18.18
31-023-21500-00-00	5970	1.30	17.25
31-023-21500-00-00	5980	1.12	17.74
31-023-21500-00-00	5990	1.09	23.60
31-023-21500-00-00	6000	1.16	20.96
31-023-21500-00-00	6010	1.70	17.76
31-023-21500-00-00	6020	1.44	17.18
31-023-21500-00-00	6030	1.41	19.22
31-023-21500-00-00	6040	1.54	23.20
31-023-21500-00-00	6050	1.60	
31-023-21500-00-00	6060	1.74	23.54
31-023-21500-00-00	6070	1.89	26.83
31-023-21500-00-00	6080	1.84	21.52
31-023-21500-00-00	6090	2.08	23.63
31-023-21500-00-00	6100	1.90	23.78
31-023-21500-00-00	6110	1.82	
31-023-21500-00-00	6120	2.23	37.80
31-023-21500-00-00	6130	1.94	36.90
31-023-21500-00-00	6140	2.06	34.04
31-023-21500-00-00	6150	2.16	36.85
31-023-21500-00-00	6160	2.26	38.93
31-023-21500-00-00	6170	1.94	78.34
31-023-21500-00-00	6180	0.54	62.49
31-023-21500-00-00	6190	0.58	59.32
31-023-21500-00-00	6200	0.53	66.51
31-023-21500-00-00	6210	0.70	70.69
31-023-21500-00-00	6220	0.62	70.29
31-023-21500-00-00	6230	0.50	70.97
31-023-21500-00-00	6240	0.69	66.82
31-023-21500-00-00	6250	0.94	74.07
31-023-21500-00-00	6260	0.58	68.19
31-023-21500-00-00	6270	0.59	74.28
31-023-21500-00-00	6280	0.55	84.10
31-023-21500-00-00	6290	0.44	78.62
31-023-21500-00-00	6300	0.34	83.38
31-023-21500-00-00	6310	0.55	79.18
31-023-21500-00-00	6320	2.49	88.23
31-023-21500-00-00	6330	0.15	76.08
31-023-21500-00-00	6340	0.24	72.57
31-023-21500-00-00	6350	0.48	81.55
31-023-21500-00-00	6360	0.40	80.29
31-023-21500-00-00	6370	0.32	77.56
31-023-21500-00-00	6380	0.38	75.58
31-023-21500-00-00	6390	0.23	78.32
31-023-21500-00-00	6400	0.29	80.08
31-023-21500-00-00	6410	0.34	78.19
31-023-21500-00-00	6420	0.34	78.30
31-023-21500-00-00	6430	0.29	73.88
31-023-21500-00-00	6440	0.63	70.71
31-023-21500-00-00	6450	0.46	69.69
31-023-21500-00-00	6460	0.34	70.18
31-023-21500-00-00	6520	0.21	
31-023-21500-00-00	6530	0.23	
31-023-21500-00-00	6540	0.21	
31-023-21500-00-00	6550	0.28	
Duplicates			
31-023-21500-00-00	6000-2	1.15	
31-023-21500-00-00	6100-2	1.85	
31-023-21500-00-00	6190-2	0.60	



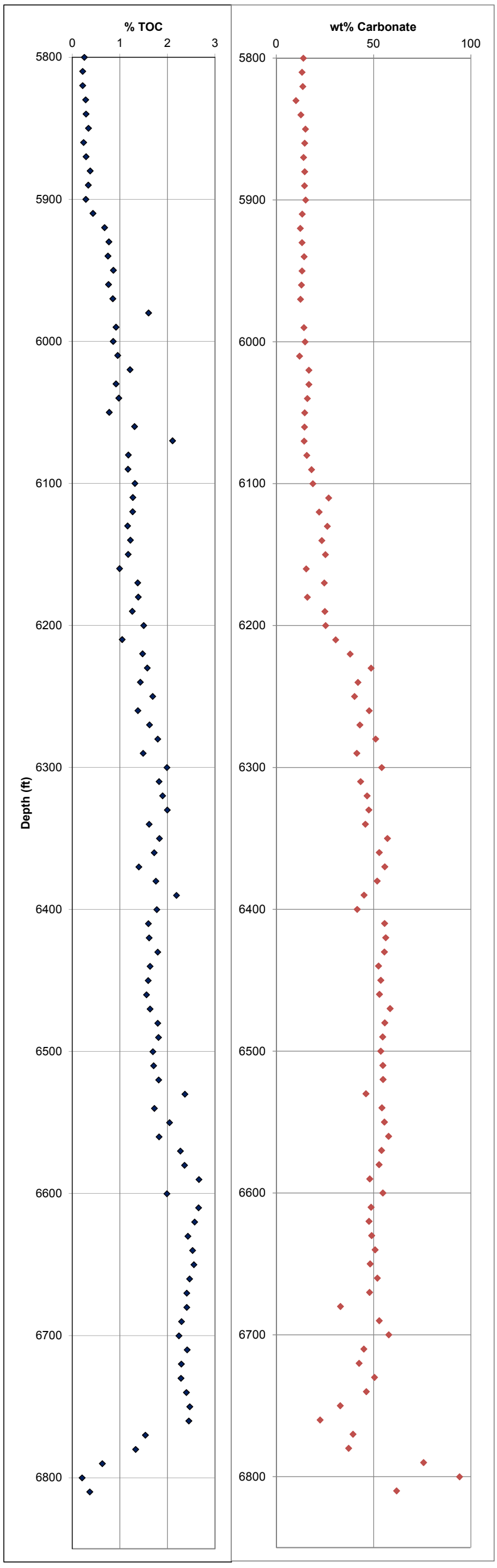
31-025-04214-00-00			
API	Depth (ft)	% TOC	wt% Carbonate
31-025-04214-00-00	7400	0.28	17.18
31-025-04214-00-00	7410	0.28	17.27
31-025-04214-00-00	7420	0.35	17.35
31-025-04214-00-00	7430	0.28	18.17
31-025-04214-00-00	7440	0.32	17.24
31-025-04214-00-00	7450	0.34	17.26
31-025-04214-00-00	7460	0.34	18.75
31-025-04214-00-00	7470	0.34	22.04
31-025-04214-00-00	7480	0.31	19.74
31-025-04214-00-00	7490	0.29	19.78
31-025-04214-00-00	7500	0.29	17.96
31-025-04214-00-00	7510	0.32	15.44
31-025-04214-00-00	7520	0.46	15.68
31-025-04214-00-00	7530	0.63	18.29
31-025-04214-00-00	7540	0.71	16.70
31-025-04214-00-00	7550	0.79	16.91
31-025-04214-00-00	7560	0.91	21.28
31-025-04214-00-00	7570	1.09	14.02
31-025-04214-00-00	7580	0.94	14.50
31-025-04214-00-00	7590	0.56	17.59
31-025-04214-00-00	7600	1.03	17.32
31-025-04214-00-00	7610	0.80	15.39
31-025-04214-00-00	7620	0.79	12.48
31-025-04214-00-00	7630	0.97	26.59
31-025-04214-00-00	7640	0.96	15.65
31-025-04214-00-00	7650	0.61	16.44
31-025-04214-00-00	7660	0.77	17.13
31-025-04214-00-00	7670	0.87	16.76
31-025-04214-00-00	7680	0.90	15.46
31-025-04214-00-00	7690	0.93	21.68
31-025-04214-00-00	7700	0.90	16.92
31-025-04214-00-00	7710	0.68	23.85
31-025-04214-00-00	7720	0.85	21.77
31-025-04214-00-00	7730	0.90	18.09
31-025-04214-00-00	7740	0.66	38.21
31-025-04214-00-00	7750	0.94	34.63
31-025-04214-00-00	7760	1.12	28.51
31-025-04214-00-00	7770	1.11	19.61
31-025-04214-00-00	7780	1.17	29.80
31-025-04214-00-00	7790	1.10	28.70
31-025-04214-00-00	7800	1.41	33.46
31-025-04214-00-00	7810	1.13	37.79
31-025-04214-00-00	7820	1.42	41.17
31-025-04214-00-00	7830	0.95	29.18
31-025-04214-00-00	7840	1.45	45.33
31-025-04214-00-00	7850	1.29	41.82
31-025-04214-00-00	7860	1.52	63.90
31-025-04214-00-00	7870	1.21	39.73
31-025-04214-00-00	7880	1.14	60.36
31-025-04214-00-00	7890	1.37	46.20
31-025-04214-00-00	7900	1.38	
31-025-04214-00-00	7910	1.39	57.32
31-025-04214-00-00	7920	1.31	52.18
31-025-04214-00-00	7930	1.23	44.42
31-025-04214-00-00	7940	1.27	40.57
31-025-04214-00-00	7950	1.37	
31-025-04214-00-00	7960	1.47	67.25
31-025-04214-00-00	7970	1.43	48.24
31-025-04214-00-00	7980	1.53	51.81
31-025-04214-00-00	7990	1.35	62.75
31-025-04214-00-00	8000	1.36	63.69
31-025-04214-00-00	8010	1.35	59.51
31-025-04214-00-00	8020	1.27	59.79
31-025-04214-00-00	8030	1.27	51.77
31-025-04214-00-00	8040	1.15	63.22
31-025-04214-00-00	8050	1.57	49.84
31-025-04214-00-00	8060	1.69	56.65
31-025-04214-00-00	8070	1.70	49.76
31-025-04214-00-00	8080	1.82	59.59
31-025-04214-00-00	8090	1.82	52.38
31-025-04214-00-00	8100	1.68	50.99
31-025-04214-00-00	8110	1.75	47.30
31-025-04214-00-00	8120	1.99	42.92
31-025-04214-00-00	8130	2.02	48.30
31-025-04214-00-00	8140	2.07	52.55
31-025-04214-00-00	8150	1.85	47.23
31-025-04214-00-00	8160	2.27	57.65
31-025-04214-00-00	8170	2.13	55.40
31-025-04214-00-00	8180	1.97	47.05
31-025-04214-00-00	8190	2.10	47.69
31-025-04214-00-00	8200	1.81	40.93
31-025-04214-00-00	8210	1.89	52.23
31-025-04214-00-00	8220	2.27	42.13
31-025-04214-00-00	8230	2.28	37.27
31-025-04214-00-00	8240	1.10	76.10
31-025-04214-00-00	8250	0.91	62.31
31-025-04214-00-00	8260	0.76	65.08
31-025-04214-00-00	8270	0.72	54.15
31-025-04214-00-00	8280	0.88	68.04
31-025-04214-00-00	8290	0.41	82.78
31-025-04214-00-00	8300	0.43	81.35
Duplicates			
31-025-04214-00-00	7400-2	0.27	
31-025-04214-00-00	7540-2	0.68	
31-025-04214-00-00	7750-2	0.91	
31-025-04214-00-00	7840-2	1.48	
31-025-04214-00-00	8120-2	1.97	



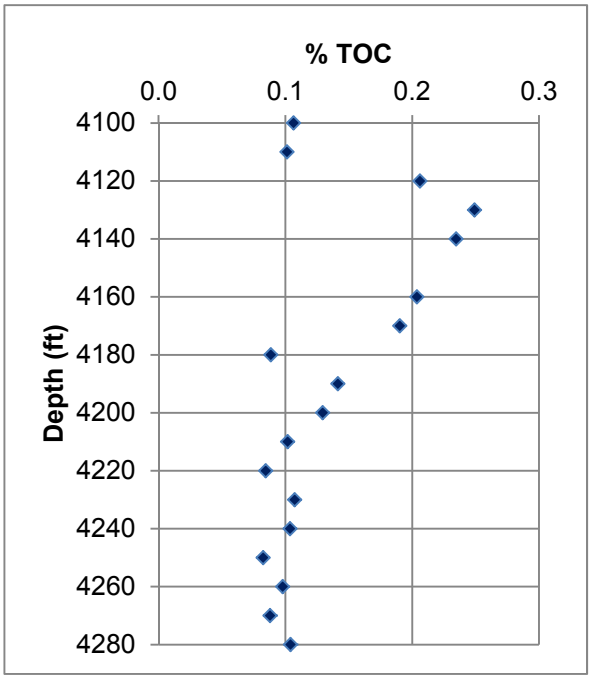
31-025-04364-00-00			
API	Depth (ft)	% TOC	wt% Carbonate
31-025-04364-00-00	6730		
31-025-04364-00-00	6740		15.01
31-025-04364-00-00	6750		
31-025-04364-00-00	6760		14.68
31-025-04364-00-00	6770	0.10	
31-025-04364-00-00	6780	0.11	15.49
31-025-04364-00-00	6790	0.11	
31-025-04364-00-00	6800	0.09	15.92
31-025-04364-00-00	6810	0.16	
31-025-04364-00-00	6820	0.15	16.29
31-025-04364-00-00	6830	0.17	
31-025-04364-00-00	6840	0.12	14.89
31-025-04364-00-00	6850	0.17	
31-025-04364-00-00	6860	0.18	15.45
31-025-04364-00-00	6870	0.21	
31-025-04364-00-00	6880	0.22	14.19
31-025-04364-00-00	6890	0.22	
31-025-04364-00-00	6900	0.30	15.04
31-025-04364-00-00	6910	0.25	
31-025-04364-00-00	6920	0.28	14.50
31-025-04364-00-00	6930	0.21	
31-025-04364-00-00	6940	0.22	16.04
31-025-04364-00-00	6950	0.26	
31-025-04364-00-00	6960	0.31	15.93
31-025-04364-00-00	6970	0.32	
31-025-04364-00-00	6980	0.26	13.55
31-025-04364-00-00	6990	0.42	
31-025-04364-00-00	7000	0.37	13.88
31-025-04364-00-00	7010	0.49	
31-025-04364-00-00	7020	0.54	14.88
31-025-04364-00-00	7030	0.83	
31-025-04364-00-00	7040	0.76	15.72
31-025-04364-00-00	7050	0.78	
31-025-04364-00-00	7060		15.64
31-025-04364-00-00	7070	0.69	
31-025-04364-00-00	7080		16.37
31-025-04364-00-00	7090	0.83	
31-025-04364-00-00	7100	0.54	17.63
31-025-04364-00-00	7110		
31-025-04364-00-00	7120	0.79	27.04
31-025-04364-00-00	7130	0.92	
31-025-04364-00-00	7140	0.95	36.90
31-025-04364-00-00	7150	1.05	
31-025-04364-00-00	7160	1.02	37.50
31-025-04364-00-00	7170	0.89	
31-025-04364-00-00	7180	1.00	43.45
31-025-04364-00-00	7190	0.87	
31-025-04364-00-00	7200	0.87	50.54
31-025-04364-00-00	7210	0.69	
31-025-04364-00-00	7220	0.86	50.09
31-025-04364-00-00	7230	0.52	
31-025-04364-00-00	7240	0.64	31.63
31-025-04364-00-00	7250	0.56	
31-025-04364-00-00	7260	0.54	35.18
31-025-04364-00-00	7270	1.01	
31-025-04364-00-00	7280	0.64	32.86
31-025-04364-00-00	7290	0.76	
31-025-04364-00-00	7300	0.24	14.24
31-025-04364-00-00	7310	1.16	
31-025-04364-00-00	7320	0.94	35.78
31-025-04364-00-00	7330	1.30	
31-025-04364-00-00	7340	1.16	51.89
31-025-04364-00-00	7350	0.88	
31-025-04364-00-00	7360	0.67	64.19
31-025-04364-00-00	7370	0.64	
31-025-04364-00-00	7380	0.50	64.71
31-025-04364-00-00	7390	0.60	
31-025-04364-00-00	7400	0.52	57.28
31-025-04364-00-00	7410	0.59	
Duplicates			
31-025-04364-00-00	6940-2	0.21	
31-025-04364-00-00	7110-2	0.80	
31-025-04364-00-00	7350-2	1.05	



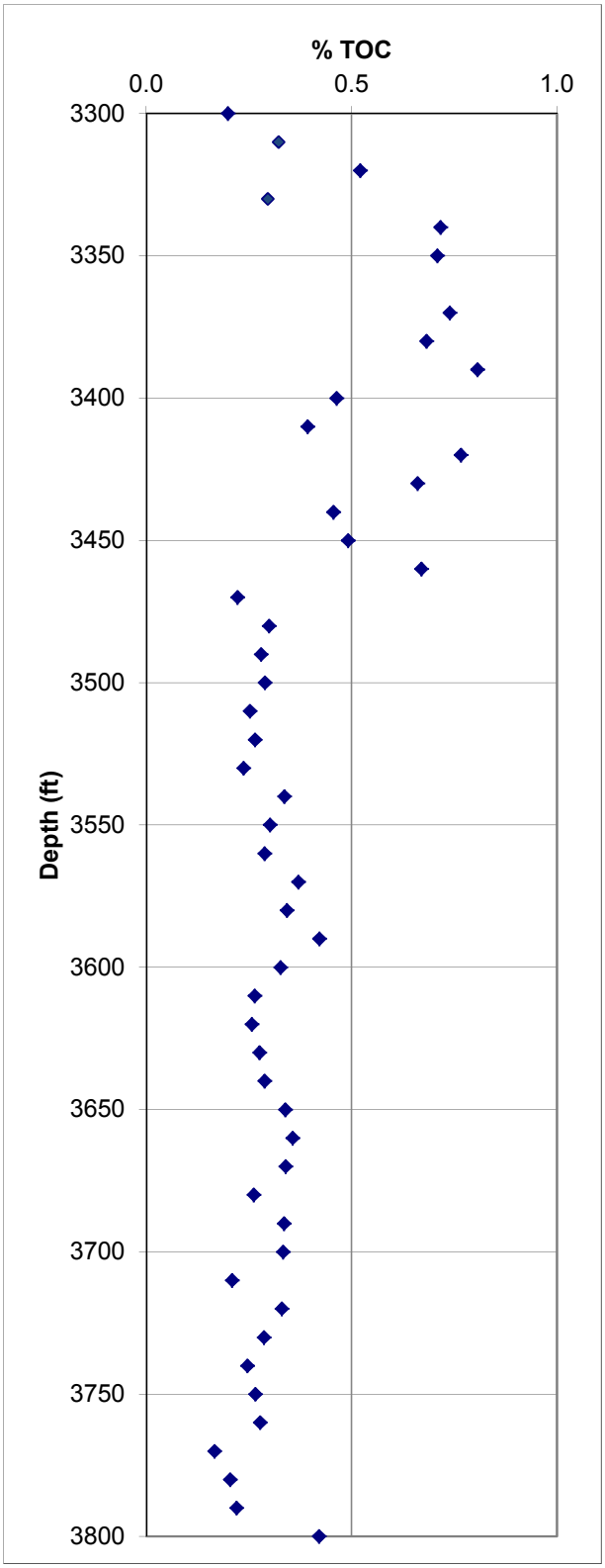
31-025-04379-00-00			
API	Depth (ft)	% TOC	wt% Carbonate
31-025-04379-00-00	5800	0.25	13.97
31-025-04379-00-00	5810	0.22	13.32
31-025-04379-00-00	5820	0.22	13.72
31-025-04379-00-00	5830	0.28	10.14
31-025-04379-00-00	5840	0.29	12.71
31-025-04379-00-00	5850	0.34	15.03
31-025-04379-00-00	5860	0.24	14.64
31-025-04379-00-00	5870	0.29	14.10
31-025-04379-00-00	5880	0.37	14.70
31-025-04379-00-00	5890	0.34	14.57
31-025-04379-00-00	5900	0.28	15.13
31-025-04379-00-00	5910	0.43	13.36
31-025-04379-00-00	5920	0.68	12.39
31-025-04379-00-00	5930	0.77	13.31
31-025-04379-00-00	5940	0.75	14.33
31-025-04379-00-00	5950	0.86	13.28
31-025-04379-00-00	5960	0.76	13.01
31-025-04379-00-00	5970	0.85	12.52
31-025-04379-00-00	5980	1.60	
31-025-04379-00-00	5990	0.92	14.26
31-025-04379-00-00	6000	0.86	14.89
31-025-04379-00-00	6010	0.95	12.00
31-025-04379-00-00	6020	1.21	16.79
31-025-04379-00-00	6030	0.92	16.77
31-025-04379-00-00	6040	0.98	16.03
31-025-04379-00-00	6050	0.77	14.64
31-025-04379-00-00	6060	1.31	14.60
31-025-04379-00-00	6070	2.11	14.38
31-025-04379-00-00	6080	1.18	15.73
31-025-04379-00-00	6090	1.17	18.19
31-025-04379-00-00	6100	1.31	18.87
31-025-04379-00-00	6110	1.27	26.98
31-025-04379-00-00	6120	1.27	22.13
31-025-04379-00-00	6130	1.16	26.28
31-025-04379-00-00	6140	1.22	23.41
31-025-04379-00-00	6150	1.17	25.33
31-025-04379-00-00	6160	0.99	15.42
31-025-04379-00-00	6170	1.38	24.76
31-025-04379-00-00	6180	1.39	16.03
31-025-04379-00-00	6190	1.26	25.00
31-025-04379-00-00	6200	1.50	25.42
31-025-04379-00-00	6210	1.05	30.56
31-025-04379-00-00	6220	1.47	38.07
31-025-04379-00-00	6230	1.57	48.81
31-025-04379-00-00	6240	1.43	42.01
31-025-04379-00-00	6250	1.69	40.23
31-025-04379-00-00	6260	1.38	47.76
31-025-04379-00-00	6270	1.62	42.98
31-025-04379-00-00	6280	1.80	51.15
31-025-04379-00-00	6290	1.49	41.47
31-025-04379-00-00	6300	1.99	54.22
31-025-04379-00-00	6310	1.82	43.36
31-025-04379-00-00	6320	1.90	46.68
31-025-04379-00-00	6330	2.00	47.57
31-025-04379-00-00	6340	1.61	45.89
31-025-04379-00-00	6350	1.83	57.18
31-025-04379-00-00	6360	1.72	52.96
31-025-04379-00-00	6370	1.40	55.83
31-025-04379-00-00	6380	1.76	51.93
31-025-04379-00-00	6390	2.19	45.14
31-025-04379-00-00	6400	1.78	41.68
31-025-04379-00-00	6410	1.60	55.70
31-025-04379-00-00	6420	1.61	56.33
31-025-04379-00-00	6430	1.79	55.57
31-025-04379-00-00	6440	1.63	52.63
31-025-04379-00-00	6450	1.59	53.75
31-025-04379-00-00	6460	1.56	53.03
31-025-04379-00-00	6470	1.63	58.51
31-025-04379-00-00	6480	1.79	55.85
31-025-04379-00-00	6490	1.81	54.74
31-025-04379-00-00	6500	1.69	53.77
31-025-04379-00-00	6510	1.71	54.82
31-025-04379-00-00	6520	1.82	54.94
31-025-04379-00-00	6530	2.36	46.12
31-025-04379-00-00	6540	1.72	54.38
31-025-04379-00-00	6550	2.04	55.61
31-025-04379-00-00	6560	1.82	57.72
31-025-04379-00-00	6570	2.27	54.17
31-025-04379-00-00	6580	2.36	52.85
31-025-04379-00-00	6590	2.66	48.08
31-025-04379-00-00	6600	1.99	54.80
31-025-04379-00-00	6610	2.65	48.79
31-025-04379-00-00	6620	2.57	47.72
31-025-04379-00-00	6630	2.43	49.08
31-025-04379-00-00	6640	2.53	50.82
31-025-04379-00-00	6650	2.55	48.28
31-025-04379-00-00	6660	2.46	52.02
31-025-04379-00-00	6670	2.40	47.97
31-025-04379-00-00	6680	2.41	33.06
31-025-04379-00-00	6690	2.29	53.02
31-025-04379-00-00	6700	2.24	57.90
31-025-04379-00-00	6710	2.41	45.02
31-025-04379-00-00	6720	2.29	42.60
31-025-04379-00-00	6730	2.28	50.49
31-025-04379-00-00	6740	2.40	46.31
31-025-04379-00-00	6750	2.47	32.91
31-025-04379-00-00	6760	2.45	22.57
31-025-04379-00-00	6770	1.53	39.49
31-025-04379-00-00	6780	1.33	37.22
31-025-04379-00-00	6790	0.63	75.78
31-025-04379-00-00	6800	0.20	94.19
31-025-04379-00-00	6810	0.37	61.90
Duplicates			
31-025-04379-00-00	6000-2	0.87	
31-025-04379-00-00	6170-2	1.38	
31-025-04379-00-00	6270-2	1.65	
31-025-04379-00-00	6360-6	1.81	
31-025-04379-00-00	6460-2	1.56	
31-025-04379-00-00	6560-2	1.83	
31-025-04379-00-00	6690-2	2.29	
31-025-04379-00-00	6790-2	0.65	



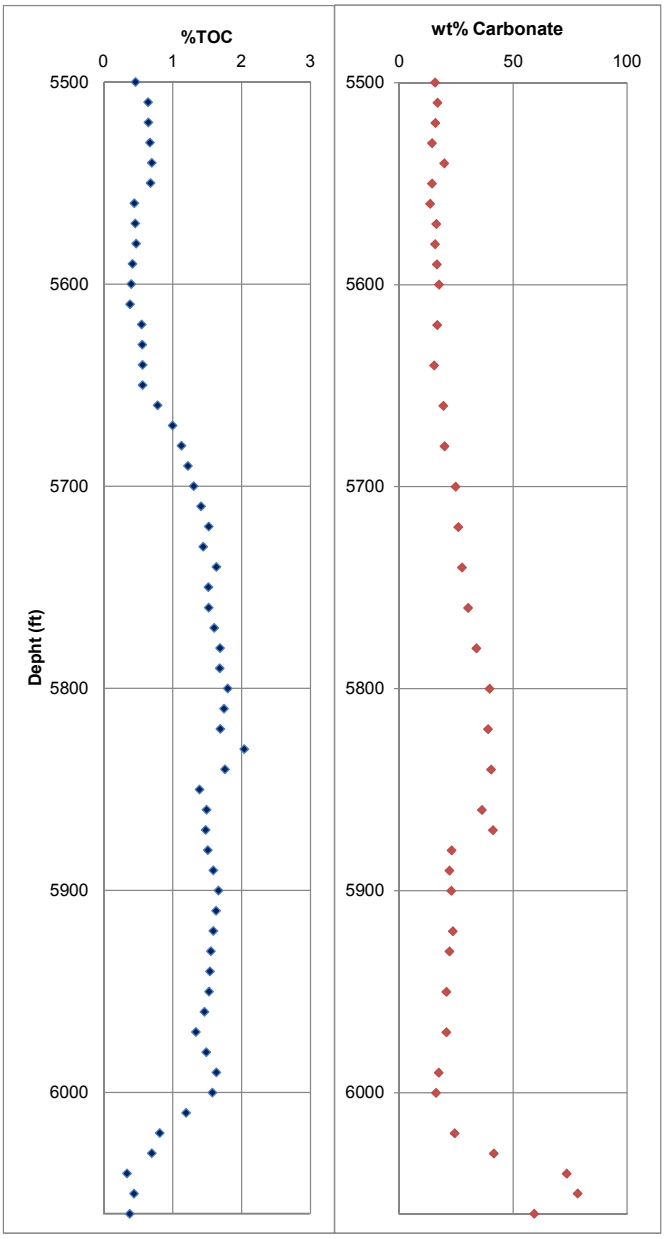
31-025-04455-00-00		
API	Depth (ft)	% TOC
31-025-04455-00-00	4100	0.11
31-025-04455-00-00	4110	0.10
31-025-04455-00-00	4120	0.21
31-025-04455-00-00	4130	0.25
31-025-04455-00-00	4140	0.23
31-025-04455-00-00	4150	
31-025-04455-00-00	4160	0.20
31-025-04455-00-00	4170	0.19
31-025-04455-00-00	4180	0.09
31-025-04455-00-00	4190	0.14
31-025-04455-00-00	4200	0.13
31-025-04455-00-00	4210	0.10
31-025-04455-00-00	4220	0.08
31-025-04455-00-00	4230	0.11
31-025-04455-00-00	4240	0.10
31-025-04455-00-00	4250	0.08
31-025-04455-00-00	4260	0.10
31-025-04455-00-00	4270	0.09
31-025-04455-00-00	4280	0.10



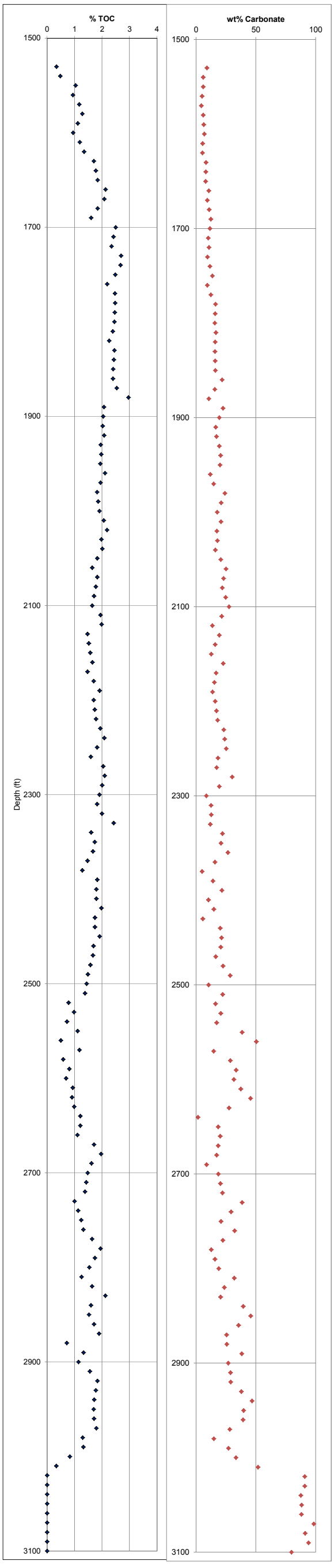
31-037-10776-00-00		
API	Depth (ft)	% TOC
31-037-10776-00-00	3300	0.20
31-037-10776-00-00	3310	0.32
31-037-10776-00-00	3320	0.52
31-037-10776-00-00	3330	0.30
31-037-10776-00-00	3340	0.72
31-037-10776-00-00	3350	0.71
31-037-10776-00-00	3360	
31-037-10776-00-00	3370	0.74
31-037-10776-00-00	3380	0.68
31-037-10776-00-00	3390	0.81
31-037-10776-00-00	3400	0.46
31-037-10776-00-00	3410	0.39
31-037-10776-00-00	3420	0.77
31-037-10776-00-00	3430	0.66
31-037-10776-00-00	3440	0.46
31-037-10776-00-00	3450	0.49
31-037-10776-00-00	3460	0.67
31-037-10776-00-00	3470	0.22
31-037-10776-00-00	3480	0.30
31-037-10776-00-00	3490	0.28
31-037-10776-00-00	3500	0.29
31-037-10776-00-00	3510	0.25
31-037-10776-00-00	3520	0.26
31-037-10776-00-00	3530	0.24
31-037-10776-00-00	3540	0.34
31-037-10776-00-00	3550	0.30
31-037-10776-00-00	3560	0.29
31-037-10776-00-00	3570	0.37
31-037-10776-00-00	3580	0.34
31-037-10776-00-00	3590	0.42
31-037-10776-00-00	3600	0.33
31-037-10776-00-00	3610	0.26
31-037-10776-00-00	3620	0.26
31-037-10776-00-00	3630	0.28
31-037-10776-00-00	3640	0.29
31-037-10776-00-00	3650	0.34
31-037-10776-00-00	3660	0.36
31-037-10776-00-00	3670	0.34
31-037-10776-00-00	3680	0.26
31-037-10776-00-00	3690	0.34
31-037-10776-00-00	3700	0.33
31-037-10776-00-00	3710	0.21
31-037-10776-00-00	3720	0.33
31-037-10776-00-00	3730	0.29
31-037-10776-00-00	3740	0.25
31-037-10776-00-00	3750	0.27
31-037-10776-00-00	3760	0.28
31-037-10776-00-00	3770	0.17
31-037-10776-00-00	3780	0.20
31-037-10776-00-00	3790	0.22
31-037-10776-00-00	3800	0.42
Duplicates		
31-037-10776-00-00	3410-2	0.42
31-037-10776-00-00	3540-2	0.32
31-037-10776-00-00	3780-2	0.23



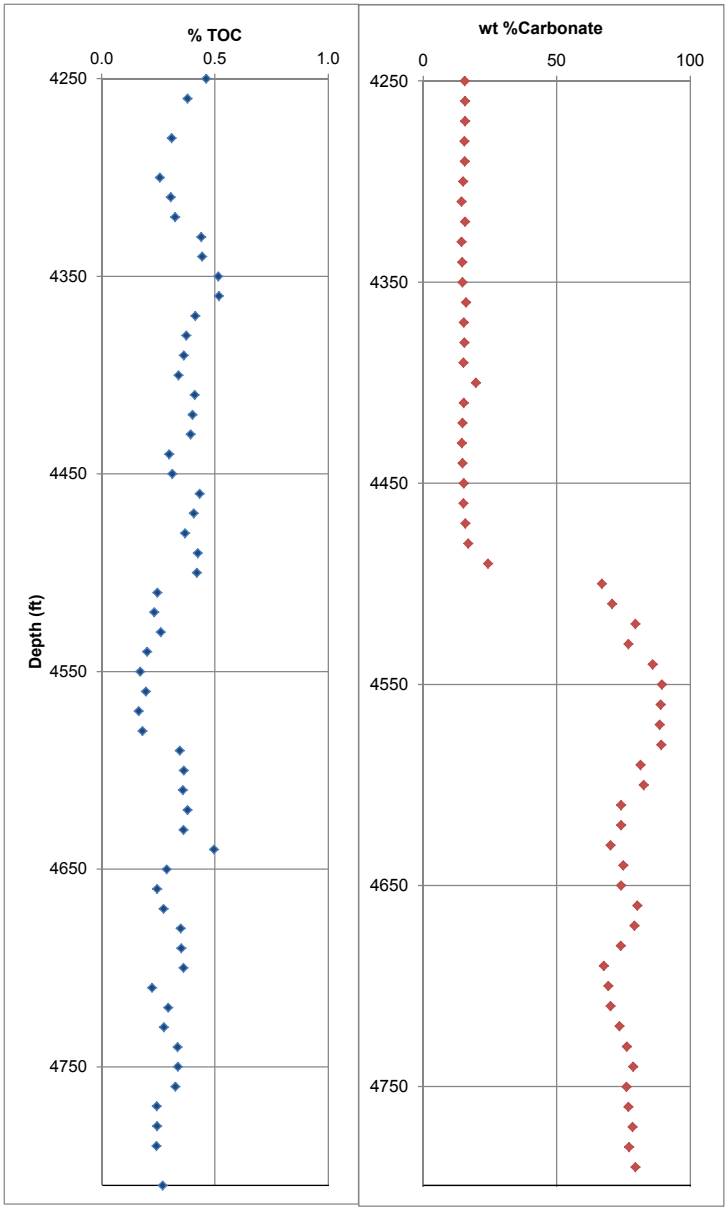
31-039-03904-00-00			
API	Depth (ft)	% TOC	wt% Carbonate
31-039-03904-00-00	5500	0.47	15.67
31-039-03904-00-00	5510	0.65	16.77
31-039-03904-00-00	5520	0.65	15.77
31-039-03904-00-00	5530	0.67	14.40
31-039-03904-00-00	5540	0.70	19.79
31-039-03904-00-00	5550	0.68	14.30
31-039-03904-00-00	5560	0.45	13.53
31-039-03904-00-00	5570	0.46	16.22
31-039-03904-00-00	5580	0.47	15.69
31-039-03904-00-00	5590	0.42	16.52
31-039-03904-00-00	5600	0.40	17.45
31-039-03904-00-00	5610	0.38	
31-039-03904-00-00	5620	0.55	16.60
31-039-03904-00-00	5630	0.56	
31-039-03904-00-00	5640	0.57	15.31
31-039-03904-00-00	5650	0.57	
31-039-03904-00-00	5660	0.78	19.33
31-039-03904-00-00	5670	1.00	
31-039-03904-00-00	5680	1.13	19.82
31-039-03904-00-00	5690	1.23	
31-039-03904-00-00	5700	1.31	24.70
31-039-03904-00-00	5710	1.42	
31-039-03904-00-00	5720	1.52	25.91
31-039-03904-00-00	5730	1.45	
31-039-03904-00-00	5740	1.64	27.49
31-039-03904-00-00	5750	1.52	
31-039-03904-00-00	5760	1.52	30.19
31-039-03904-00-00	5770	1.61	
31-039-03904-00-00	5780	1.69	33.91
31-039-03904-00-00	5790	1.68	
31-039-03904-00-00	5800	1.80	39.67
31-039-03904-00-00	5810	1.75	
31-039-03904-00-00	5820	1.69	38.96
31-039-03904-00-00	5830	2.04	
31-039-03904-00-00	5840	1.76	40.28
31-039-03904-00-00	5850	1.39	
31-039-03904-00-00	5860	1.49	36.22
31-039-03904-00-00	5870	1.48	41.08
31-039-03904-00-00	5880	1.51	23.00
31-039-03904-00-00	5890	1.59	22.05
31-039-03904-00-00	5900	1.67	22.80
31-039-03904-00-00	5910	1.63	
31-039-03904-00-00	5920	1.59	23.46
31-039-03904-00-00	5930	1.56	22.07
31-039-03904-00-00	5940	1.54	
31-039-03904-00-00	5950	1.53	20.69
31-039-03904-00-00	5960	1.46	
31-039-03904-00-00	5970	1.34	20.70
31-039-03904-00-00	5980	1.49	
31-039-03904-00-00	5990	1.64	17.33
31-039-03904-00-00	6000	1.58	16.10
31-039-03904-00-00	6010	1.20	
31-039-03904-00-00	6020	0.82	24.26
31-039-03904-00-00	6030	0.70	41.52
31-039-03904-00-00	6040	0.34	73.45
31-039-03904-00-00	6050	0.44	78.28
31-039-03904-00-00	6060	0.38	59.30
Duplicates			
31-039-03904-00-00	5920-2	1.68	
31-039-03904-00-00	5700-2	1.33	



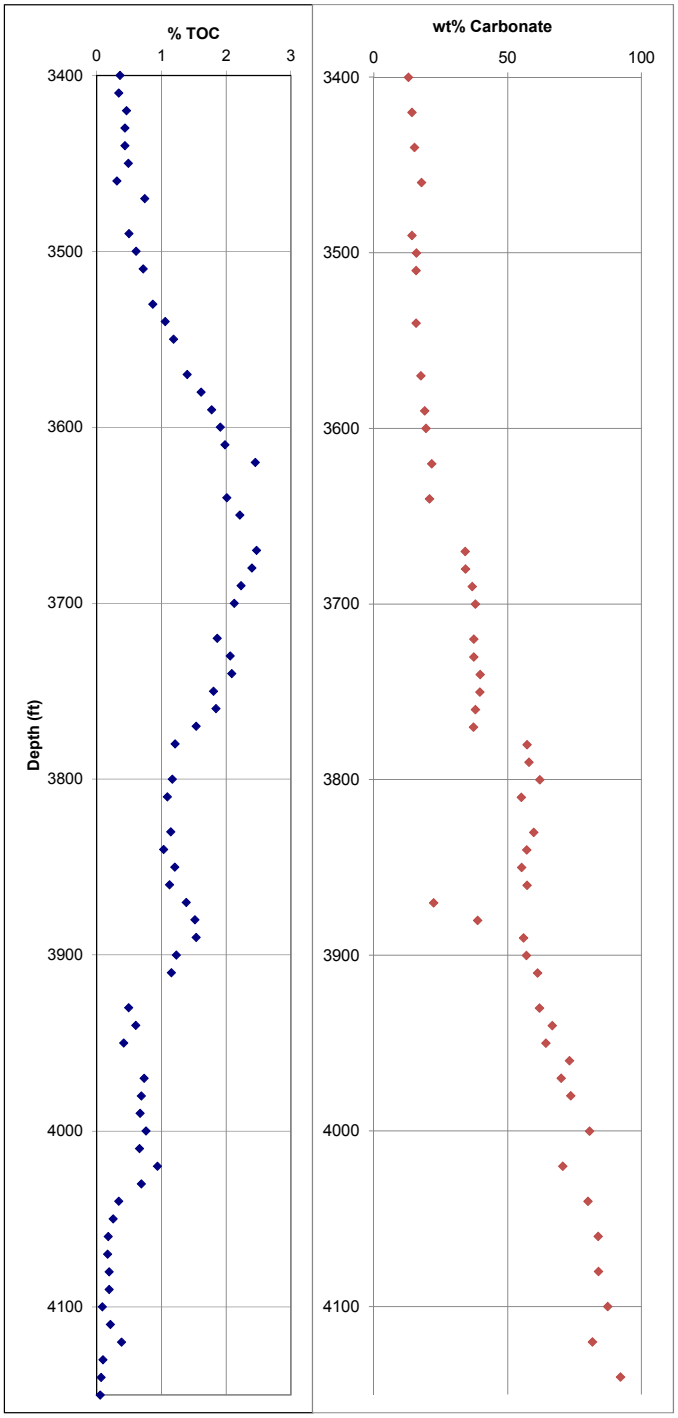
31-043-03993-00-00			
API	Depth (ft)	% TOC	wt% Carbonate
31-043-03993-00-00	1530	0.34	9.07
31-043-03993-00-00	1540	0.48	5.94
31-043-03993-00-00	1550	1.03	5.92
31-043-03993-00-00	1560	0.94	4.90
31-043-03993-00-00	1570	1.17	4.33
31-043-03993-00-00	1580	1.28	5.86
31-043-03993-00-00	1590	1.11	6.33
31-043-03993-00-00	1600	0.94	6.81
31-043-03993-00-00	1610	1.18	5.45
31-043-03993-00-00	1620	1.34	5.30
31-043-03993-00-00	1630	1.70	8.25
31-043-03993-00-00	1640	1.77	8.12
31-043-03993-00-00	1650	1.84	7.99
31-043-03993-00-00	1660	2.12	10.55
31-043-03993-00-00	1670	2.08	9.38
31-043-03993-00-00	1680	1.84	10.85
31-043-03993-00-00	1690	1.60	12.32
31-043-03993-00-00	1700	2.49	11.60
31-043-03993-00-00	1710	2.41	10.05
31-043-03993-00-00	1720	2.34	10.68
31-043-03993-00-00	1730	2.69	9.46
31-043-03993-00-00	1740	2.67	11.52
31-043-03993-00-00	1750	2.48	13.54
31-043-03993-00-00	1760	2.19	9.36
31-043-03993-00-00	1770	2.47	12.37
31-043-03993-00-00	1780	2.47	16.26
31-043-03993-00-00	1790	2.46	15.92
31-043-03993-00-00	1800	2.45	15.58
31-043-03993-00-00	1810	2.39	16.49
31-043-03993-00-00	1820	2.26	15.99
31-043-03993-00-00	1830	2.45	15.73
31-043-03993-00-00	1840	2.43	15.91
31-043-03993-00-00	1850	2.40	16.08
31-043-03993-00-00	1860	2.40	21.63
31-043-03993-00-00	1870	2.53	15.66
31-043-03993-00-00	1880	2.96	10.64
31-043-03993-00-00	1890	2.06	22.43
31-043-03993-00-00	1900	2.04	19.41
31-043-03993-00-00	1910	2.02	16.38
31-043-03993-00-00	1920	2.07	17.00
31-043-03993-00-00	1930	1.95	19.39
31-043-03993-00-00	1940	1.96	20.51
31-043-03993-00-00	1950	1.94	20.00
31-043-03993-00-00	1960	2.10	11.81
31-043-03993-00-00	1970	1.94	14.63
31-043-03993-00-00	1980	1.82	24.10
31-043-03993-00-00	1990	1.86	20.84
31-043-03993-00-00	2000	1.90	17.59
31-043-03993-00-00	2010	2.06	20.70
31-043-03993-00-00	2020	2.18	17.37
31-043-03993-00-00	2030	1.98	17.71
31-043-03993-00-00	2040	2.01	16.14
31-043-03993-00-00	2050	1.82	20.59
31-043-03993-00-00	2060	1.64	25.04
31-043-03993-00-00	2070	1.82	22.96
31-043-03993-00-00	2080	1.77	21.81
31-043-03993-00-00	2090	1.70	24.65
31-043-03993-00-00	2100	1.64	27.49
31-043-03993-00-00	2110	1.94	21.45
31-043-03993-00-00	2120	1.98	13.57
31-043-03993-00-00	2130	1.47	19.31
31-043-03993-00-00	2140	1.52	15.93
31-043-03993-00-00	2150	1.57	12.56
31-043-03993-00-00	2160	1.65	22.65
31-043-03993-00-00	2170	1.47	16.67
31-043-03993-00-00	2180	1.69	15.21
31-043-03993-00-00	2190	1.91	13.75
31-043-03993-00-00	2200	1.69	15.96
31-043-03993-00-00	2210	1.73	16.93
31-043-03993-00-00	2220	1.78	17.89
31-043-03993-00-00	2230	1.93	23.05
31-043-03993-00-00	2240	2.08	23.84
31-043-03993-00-00	2250	1.82	25.20
31-043-03993-00-00	2260	1.59	18.21
31-043-03993-00-00	2270	2.04	17.19
31-043-03993-00-00	2280	2.09	30.14
31-043-03993-00-00	2290	2.00	19.34
31-043-03993-00-00	2300	1.90	8.55
31-043-03993-00-00	2310	1.82	12.50
31-043-03993-00-00	2320	2.00	12.68
31-043-03993-00-00	2330	2.42	11.77
31-043-03993-00-00	2340	1.60	22.07
31-043-03993-00-00	2350	1.73	20.78
31-043-03993-00-00	2360	1.67	26.57
31-043-03993-00-00	2370	1.47	15.80
31-043-03993-00-00	2380	1.28	5.03
31-043-03993-00-00	2390	1.82	14.00
31-043-03993-00-00	2400	1.79	21.52
31-043-03993-00-00	2410	1.79	10.34
31-043-03993-00-00	2420	1.97	14.78
31-043-03993-00-00	2430	1.74	5.58
31-043-03993-00-00	2440	1.74	20.07
31-043-03993-00-00	2450	1.91	21.18
31-043-03993-00-00	2460	1.69	20.67
31-043-03993-00-00	2470	1.66	16.38
31-043-03993-00-00	2480	1.57	22.43
31-043-03993-00-00	2490	1.48	28.48
31-043-03993-00-00	2500	1.44	10.46
31-043-03993-00-00	2510	1.38	22.24
31-043-03993-00-00	2520	0.78	16.15
31-043-03993-00-00	2530	0.98	20.63
31-043-03993-00-00	2540	0.72	17.14
31-043-03993-00-00	2550	1.11	38.46
31-043-03993-00-00	2560	0.50	50.33
31-043-03993-00-00	2570	1.17	14.59
31-043-03993-00-00	2580	0.58	28.50
31-043-03993-00-00	2590	0.80	33.48
31-043-03993-00-00	2600	0.68	31.47
31-043-03993-00-00	2610	0.93	37.41
31-043-03993-00-00	2620	0.90	45.48
31-043-03993-00-00	2630	0.98	27.54
31-043-03993-00-00	2640	1.21	1.57
31-043-03993-00-00	2650	1.21	18.36
31-043-03993-00-00	2660	1.10	20.13
31-043-03993-00-00	2670	1.70	18.41
31-043-03993-00-00	2680	1.96	17.23
31-043-03993-00-00	2690	1.61	8.79
31-043-03993-00-00	2700	1.47	18.58
31-043-03993-00-00	2710	1.42	20.26
31-043-03993-00-00	2720	1.38	21.94
31-043-03993-00-00	2730	1.00	38.37
31-043-03993-00-00	2740	1.12	29.17
31-043-03993-00-00	2750	1.24	20.78
31-043-03993-00-00	2760	1.32	32.12
31-043-03993-00-00	2770	1.63	22.35
31-043-03993-00-00	2780	1.94	12.57
31-043-03993-00-00	2790	1.74	15.70
31-043-03993-00-00	2800	1.53	18.83
31-043-03993-00-00	2810	1.25	31.83
31-043-03993-00-00	2820	1.64	23.58
31-043-03993-00-00	2830	2.12	20.50
31-043-03993-00-00	2840	1.60	39.36
31-043-03993-00-00	2850	1.52	45.60
31-043-03993-00-00	2860	1.70	35.53
31-043-03993-00-00	2870	1.89	25.46
31-043-03993-00-00	2880	0.72	25.64
31-043-03993-00-00	2890	1.33	38.16
31-043-03993-00-00	2900	1.14	26.93
31-043-03993-00-00	2910	1.55	28.71
31-043-03993-00-00	2920	1.83	28.86
31-043-03993-00-00	2930	1.77	37.76
31-043-03993-00-00	2940	1.71	46.66
31-043-03993-00-00	2950	1.69	39.62
31-043-03993-00-00	2960	1.71	39.21
31-043-03993-00-00	2970	1.79	28.16
31-043-03993-00-00	2980	1.29	14.85
31-043-03993-00-00	2990	1.32	27.07
31-043-03993-00-00	3000	0.82	33.28
31-043-03993-00-00	3010	0.33	51.65
31-043-03993-00-00	3020	0.0001	90.77
31-043-03993-00-00	3030	0.0001	90.83
31-043-03993-00-00	3040	0.0001	87.46
31-043-03993-00-00	3050	0.0001	88.09
31-043-03993-00-00	3060	0.0001	87.94
31-043-03993-00-00	3070	0.0001	98.37
31-043-03993-00-00	3080	0.0001	91.13
31-043-03993-00-00	3090	0.0001	93.85
31-043-03993-00-00	3100	0.0001	79.75
Duplicates			
31-043-03993-00-00	1830-2	2.42	
31-043-03993-00-00	2060-2	1.64	
31-043-03993-00-00	2320-2	1.79	
31-043-03993-00-00	2430-2	1.70	
31-043-03993-00-00	2650-2	1.21	
31-043-03993-00-00	2830-2	2.11	
31-043-03993-00-00	1690-2	1.57	
31-043-03993-00-00	1620-2	1.41	
31-043-03993-00-00	2020-2		21.41



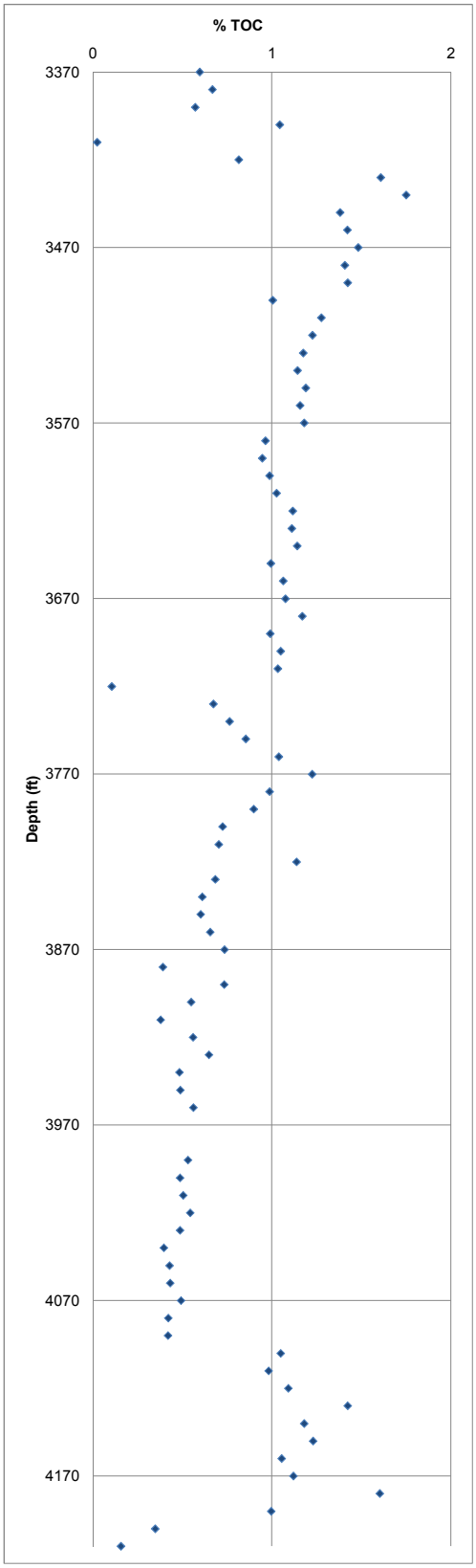
31-051-04630-00-00			
API	Depth (ft)	%TOC	wt %Carbonate
31-051-04630-00-00	4250	0.46	15.52
31-051-04630-00-00	4260	0.38	15.63
31-051-04630-00-00	4270		15.63
31-051-04630-00-00	4280	0.31	15.47
31-051-04630-00-00	4290		15.50
31-051-04630-00-00	4300	0.26	14.91
31-051-04630-00-00	4310	0.31	14.31
31-051-04630-00-00	4320	0.32	15.66
31-051-04630-00-00	4330	0.44	14.30
31-051-04630-00-00	4340	0.44	14.60
31-051-04630-00-00	4350	0.51	14.65
31-051-04630-00-00	4360	0.52	16.01
31-051-04630-00-00	4370	0.41	15.19
31-051-04630-00-00	4380	0.37	15.38
31-051-04630-00-00	4390	0.36	15.12
31-051-04630-00-00	4400	0.34	19.78
31-051-04630-00-00	4410	0.41	15.25
31-051-04630-00-00	4420	0.40	14.67
31-051-04630-00-00	4430	0.39	14.47
31-051-04630-00-00	4440	0.30	14.77
31-051-04630-00-00	4450	0.31	15.22
31-051-04630-00-00	4460	0.43	15.05
31-051-04630-00-00	4470	0.41	15.74
31-051-04630-00-00	4480	0.37	16.86
31-051-04630-00-00	4490	0.42	24.25
31-051-04630-00-00	4500	0.42	66.94
31-051-04630-00-00	4510	0.25	70.66
31-051-04630-00-00	4520	0.23	79.41
31-051-04630-00-00	4530	0.26	76.82
31-051-04630-00-00	4540	0.20	85.92
31-051-04630-00-00	4550	0.17	89.35
31-051-04630-00-00	4560	0.20	88.86
31-051-04630-00-00	4570	0.16	88.52
31-051-04630-00-00	4580	0.18	89.17
31-051-04630-00-00	4590	0.35	81.40
31-051-04630-00-00	4600	0.36	82.51
31-051-04630-00-00	4610	0.36	74.03
31-051-04630-00-00	4620	0.38	74.12
31-051-04630-00-00	4630	0.36	70.15
31-051-04630-00-00	4640	0.49	74.85
31-051-04630-00-00	4650	0.29	74.08
31-051-04630-00-00	4660	0.24	80.12
31-051-04630-00-00	4670	0.27	79.10
31-051-04630-00-00	4680	0.35	73.98
31-051-04630-00-00	4690	0.35	67.67
31-051-04630-00-00	4700	0.36	69.30
31-051-04630-00-00	4710	0.22	70.08
31-051-04630-00-00	4720	0.29	73.46
31-051-04630-00-00	4730	0.27	76.26
31-051-04630-00-00	4740	0.34	78.58
31-051-04630-00-00	4750	0.34	76.13
31-051-04630-00-00	4760	0.33	76.78
31-051-04630-00-00	4770	0.24	78.34
31-051-04630-00-00	4780	0.25	77.05
31-051-04630-00-00	4790	0.24	79.39
31-051-04630-00-00	4810	0.27	85.67
Duplicates			
31-051-04630-00-00	4810-2	0.27	



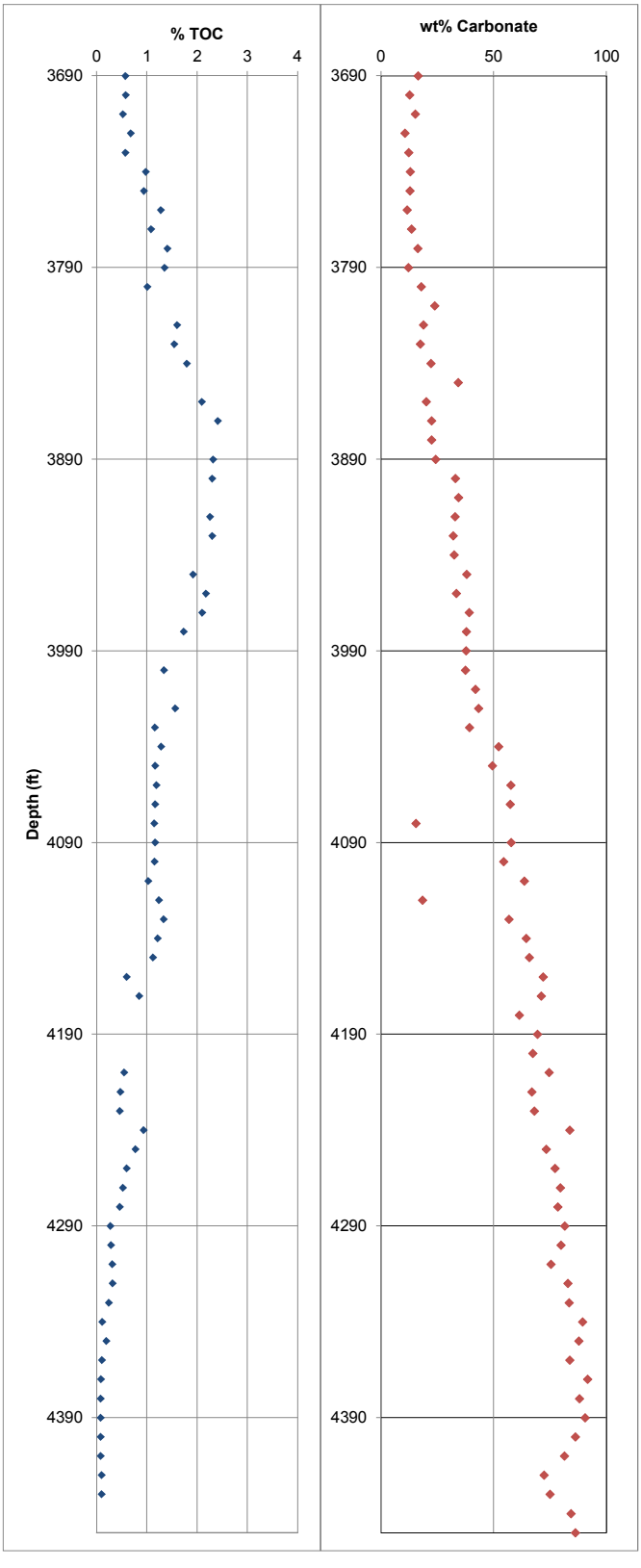
31-053-04032-00-00			
API	Depth (ft)	% TOC	wt% Carbonate
31-053-04032-00-00	3400	0.36	12.94
31-053-04032-00-00	3410	0.34	
31-053-04032-00-00	3420	0.46	14.28
31-053-04032-00-00	3430	0.43	
31-053-04032-00-00	3440	0.43	15.22
31-053-04032-00-00	3450	0.49	
31-053-04032-00-00	3460	0.31	17.85
31-053-04032-00-00	3470	0.74	
31-053-04032-00-00	3490	0.50	14.27
31-053-04032-00-00	3500	0.61	15.93
31-053-04032-00-00	3510	0.72	15.76
31-053-04032-00-00	3530	0.86	
31-053-04032-00-00	3540	1.06	15.80
31-053-04032-00-00	3550	1.18	
31-053-04032-00-00	3570	1.40	17.58
31-053-04032-00-00	3580	1.61	
31-053-04032-00-00	3590	1.77	19.05
31-053-04032-00-00	3600	1.91	19.54
31-053-04032-00-00	3610	1.98	
31-053-04032-00-00	3620	2.45	21.57
31-053-04032-00-00	3640	2.01	20.80
31-053-04032-00-00	3650	2.21	
31-053-04032-00-00	3670	2.47	34.18
31-053-04032-00-00	3680	2.40	34.29
31-053-04032-00-00	3690	2.23	36.71
31-053-04032-00-00	3700	2.12	37.96
31-053-04032-00-00	3720	1.86	37.36
31-053-04032-00-00	3730	2.06	37.30
31-053-04032-00-00	3740	2.09	39.68
31-053-04032-00-00	3750	1.80	39.63
31-053-04032-00-00	3760	1.84	37.93
31-053-04032-00-00	3770	1.54	37.18
31-053-04032-00-00	3780	1.21	57.22
31-053-04032-00-00	3790		57.98
31-053-04032-00-00	3800	1.17	62.04
31-053-04032-00-00	3810	1.09	55.09
31-053-04032-00-00	3830	1.14	59.76
31-053-04032-00-00	3840	1.03	57.18
31-053-04032-00-00	3850	1.20	55.26
31-053-04032-00-00	3860	1.12	57.26
31-053-04032-00-00	3870	1.38	22.31
31-053-04032-00-00	3880	1.52	38.77
31-053-04032-00-00	3890	1.53	55.90
31-053-04032-00-00	3900	1.23	56.98
31-053-04032-00-00	3910	1.15	61.15
31-053-04032-00-00	3930	0.49	61.94
31-053-04032-00-00	3940	0.60	66.61
31-053-04032-00-00	3950	0.42	64.29
31-053-04032-00-00	3960		73.09
31-053-04032-00-00	3970	0.73	69.94
31-053-04032-00-00	3980	0.69	73.58
31-053-04032-00-00	3990	0.67	
31-053-04032-00-00	4000	0.76	80.65
31-053-04032-00-00	4010	0.66	
31-053-04032-00-00	4020	0.93	70.56
31-053-04032-00-00	4030	0.69	
31-053-04032-00-00	4040	0.34	80.01
31-053-04032-00-00	4050	0.25	
31-053-04032-00-00	4060	0.17	83.76
31-053-04032-00-00	4070	0.16	
31-053-04032-00-00	4080	0.19	83.89
31-053-04032-00-00	4090	0.19	
31-053-04032-00-00	4100	0.08	87.37
31-053-04032-00-00	4110	0.21	
31-053-04032-00-00	4120	0.38	81.69
31-053-04032-00-00	4130	0.10	
31-053-04032-00-00	4140	0.06	92.12
31-053-04032-00-00	4150	0.05	
Duplicates			
31-053-04032-00-00	3910-2	1.14	
31-053-04032-00-00	4050-2	0.29	



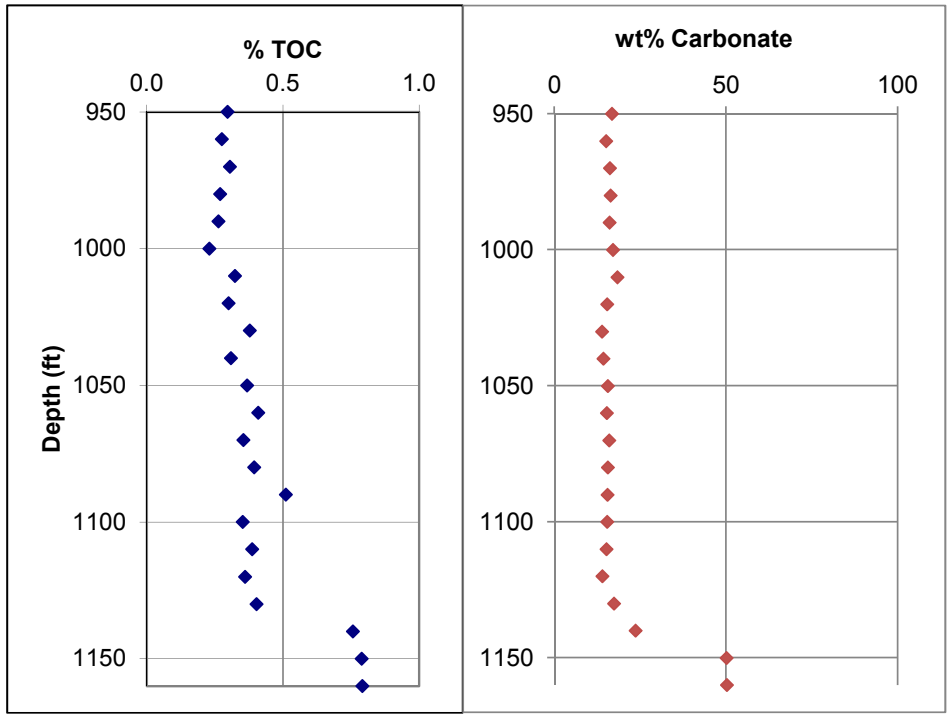
31-053-09578-00-00		
API	Depth (ft)	% TOC
31-053-09578-00-00	3370	0.60
31-053-09578-00-00	3380	0.67
31-053-09578-00-00	3390	0.57
31-053-09578-00-00	3400	1.04
31-053-09578-00-00	3410	0.02
31-053-09578-00-00	3420	0.82
31-053-09578-00-00	3430	1.61
31-053-09578-00-00	3440	1.75
31-053-09578-00-00	3450	1.38
31-053-09578-00-00	3460	1.42
31-053-09578-00-00	3470	1.48
31-053-09578-00-00	3480	1.41
31-053-09578-00-00	3490	1.42
31-053-09578-00-00	3500	1.01
31-053-09578-00-00	3510	1.28
31-053-09578-00-00	3520	1.23
31-053-09578-00-00	3530	1.18
31-053-09578-00-00	3540	1.14
31-053-09578-00-00	3550	1.19
31-053-09578-00-00	3560	1.16
31-053-09578-00-00	3570	1.18
31-053-09578-00-00	3580	0.96
31-053-09578-00-00	3590	0.95
31-053-09578-00-00	3600	0.99
31-053-09578-00-00	3610	1.03
31-053-09578-00-00	3620	1.12
31-053-09578-00-00	3630	1.11
31-053-09578-00-00	3640	1.14
31-053-09578-00-00	3650	0.99
31-053-09578-00-00	3660	1.06
31-053-09578-00-00	3670	1.08
31-053-09578-00-00	3680	1.17
31-053-09578-00-00	3690	0.99
31-053-09578-00-00	3700	1.05
31-053-09578-00-00	3710	1.03
31-053-09578-00-00	3720	0.11
31-053-09578-00-00	3730	0.67
31-053-09578-00-00	3740	0.76
31-053-09578-00-00	3750	0.85
31-053-09578-00-00	3760	1.04
31-053-09578-00-00	3770	1.22
31-053-09578-00-00	3780	0.99
31-053-09578-00-00	3790	0.90
31-053-09578-00-00	3800	0.73
31-053-09578-00-00	3810	0.70
31-053-09578-00-00	3820	1.14
31-053-09578-00-00	3830	0.68
31-053-09578-00-00	3840	0.61
31-053-09578-00-00	3850	0.60
31-053-09578-00-00	3860	0.66
31-053-09578-00-00	3870	0.73
31-053-09578-00-00	3880	0.39
31-053-09578-00-00	3890	0.73
31-053-09578-00-00	3900	0.55
31-053-09578-00-00	3910	0.38
31-053-09578-00-00	3920	0.56
31-053-09578-00-00	3930	0.65
31-053-09578-00-00	3940	0.48
31-053-09578-00-00	3950	0.49
31-053-09578-00-00	3960	0.56
31-053-09578-00-00	3970	
31-053-09578-00-00	3980	
31-053-09578-00-00	3990	0.53
31-053-09578-00-00	4000	0.49
31-053-09578-00-00	4010	0.51
31-053-09578-00-00	4020	0.54
31-053-09578-00-00	4030	0.49
31-053-09578-00-00	4040	0.40
31-053-09578-00-00	4050	0.43
31-053-09578-00-00	4060	0.43
31-053-09578-00-00	4070	0.49
31-053-09578-00-00	4080	0.42
31-053-09578-00-00	4090	0.42
31-053-09578-00-00	4100	1.05
31-053-09578-00-00	4110	0.98
31-053-09578-00-00	4120	1.09
31-053-09578-00-00	4130	1.42
31-053-09578-00-00	4140	1.18
31-053-09578-00-00	4150	1.23
31-053-09578-00-00	4160	1.06
31-053-09578-00-00	4170	1.12
31-053-09578-00-00	4180	1.60
31-053-09578-00-00	4190	1.00
31-053-09578-00-00	4200	0.35
31-053-09578-00-00	4210	0.16
Duplicates		
31-053-09578-00-00	3670-2	1.10
31-053-09578-00-00	3460-2	1.43
31-053-09578-00-00	3870-2	0.75



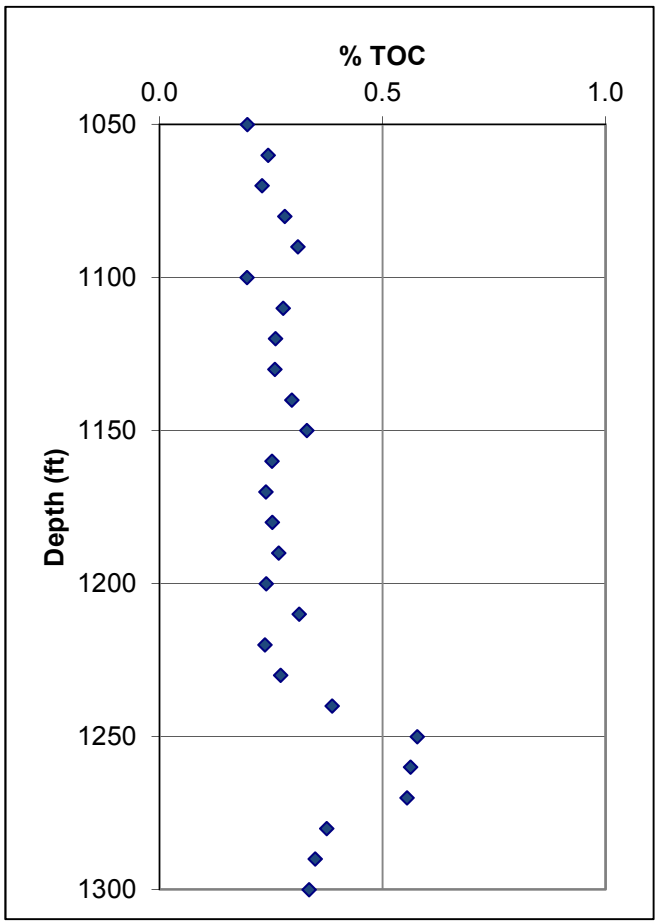
31-053-19485-00-00			
API	Depth (ft)	% TOC	wt% Carbonate
31-053-19485-00-00	3690	0.57	16.54
31-053-19485-00-00	3700	0.58	12.67
31-053-19485-00-00	3710	0.52	15.18
31-053-19485-00-00	3720	0.68	10.66
31-053-19485-00-00	3730	0.57	12.30
31-053-19485-00-00	3740	0.98	12.99
31-053-19485-00-00	3750	0.94	12.83
31-053-19485-00-00	3760	1.28	11.63
31-053-19485-00-00	3770	1.08	13.60
31-053-19485-00-00	3780	1.41	16.41
31-053-19485-00-00	3790	1.35	12.14
31-053-19485-00-00	3800	1.01	17.94
31-053-19485-00-00	3810		23.87
31-053-19485-00-00	3820	1.60	18.84
31-053-19485-00-00	3830	1.54	17.43
31-053-19485-00-00	3840	1.79	22.23
31-053-19485-00-00	3850		34.35
31-053-19485-00-00	3860	2.09	20.11
31-053-19485-00-00	3870	2.41	22.47
31-053-19485-00-00	3880		22.52
31-053-19485-00-00	3890	2.31	24.27
31-053-19485-00-00	3900	2.29	32.98
31-053-19485-00-00	3910		34.38
31-053-19485-00-00	3920	2.25	32.85
31-053-19485-00-00	3930	2.30	32.02
31-053-19485-00-00	3940		32.43
31-053-19485-00-00	3950	1.92	38.05
31-053-19485-00-00	3960	2.17	33.47
31-053-19485-00-00	3970	2.10	39.11
31-053-19485-00-00	3980	1.73	37.85
31-053-19485-00-00	3990		37.81
31-053-19485-00-00	4000	1.34	37.52
31-053-19485-00-00	4010		41.94
31-053-19485-00-00	4020	1.56	43.32
31-053-19485-00-00	4030	1.15	39.26
31-053-19485-00-00	4040	1.28	52.23
31-053-19485-00-00	4050	1.16	49.50
31-053-19485-00-00	4060	1.19	57.68
31-053-19485-00-00	4070	1.16	57.40
31-053-19485-00-00	4080	1.14	15.48
31-053-19485-00-00	4090	1.16	57.81
31-053-19485-00-00	4100	1.15	54.39
31-053-19485-00-00	4110	1.03	63.61
31-053-19485-00-00	4120	1.24	18.45
31-053-19485-00-00	4130	1.33	56.85
31-053-19485-00-00	4140	1.21	64.50
31-053-19485-00-00	4150	1.12	65.89
31-053-19485-00-00	4160	0.60	71.97
31-053-19485-00-00	4170	0.84	71.19
31-053-19485-00-00	4180		61.42
31-053-19485-00-00	4190		69.47
31-053-19485-00-00	4200		67.42
31-053-19485-00-00	4210	0.54	74.61
31-053-19485-00-00	4220	0.47	66.92
31-053-19485-00-00	4230	0.46	68.02
31-053-19485-00-00	4240	0.93	83.83
31-053-19485-00-00	4250	0.77	73.41
31-053-19485-00-00	4260	0.60	77.22
31-053-19485-00-00	4270	0.52	79.65
31-053-19485-00-00	4280	0.46	78.51
31-053-19485-00-00	4290	0.27	81.58
31-053-19485-00-00	4300	0.28	79.93
31-053-19485-00-00	4310	0.31	75.51
31-053-19485-00-00	4320	0.31	83.00
31-053-19485-00-00	4330	0.24	83.47
31-053-19485-00-00	4340	0.11	89.43
31-053-19485-00-00	4350	0.19	87.76
31-053-19485-00-00	4360	0.10	83.80
31-053-19485-00-00	4370	0.08	91.68
31-053-19485-00-00	4380	0.08	88.11
31-053-19485-00-00	4390	0.08	90.63
31-053-19485-00-00	4400	0.08	86.25
31-053-19485-00-00	4410	0.08	81.44
31-053-19485-00-00	4420	0.10	72.37
31-053-19485-00-00	4430	0.10	74.96
31-053-19485-00-00	4440		84.28
31-053-19485-00-00	4450		86.29
Duplicates			
31-053-19485-00-00	3900-2	2.33	
31-053-19485-00-00	4060-2	1.19	
31-053-19485-00-00	4120-2	1.28	
31-053-19485-00-00	4270-2	0.56	



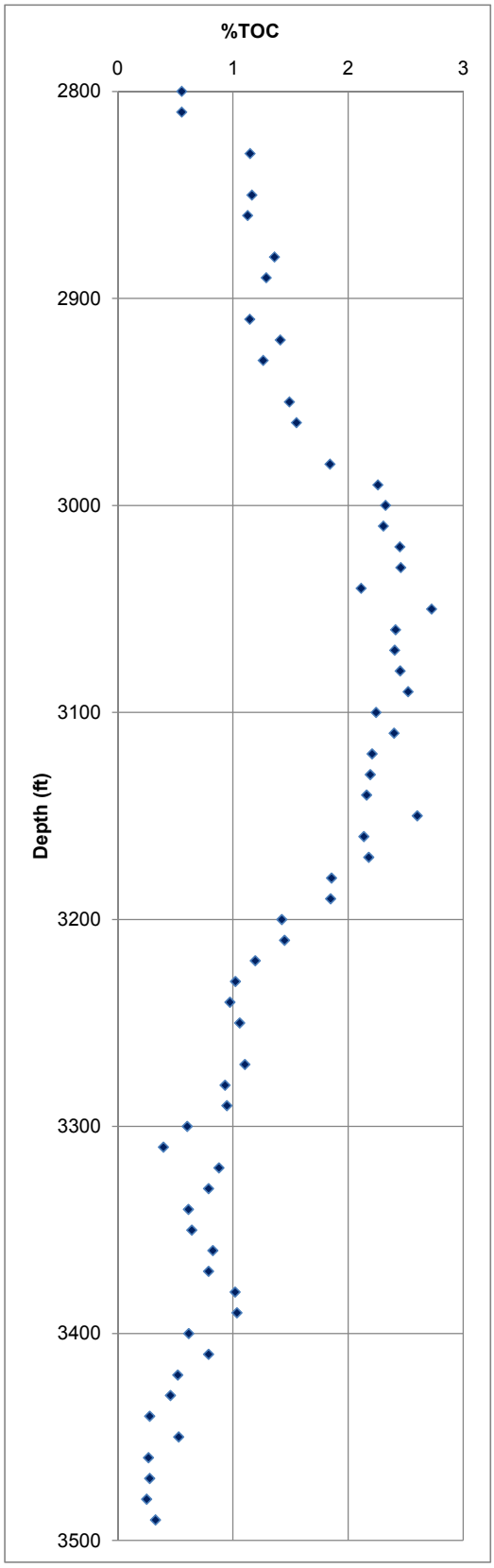
31-055-04502-00-00			
API	Depth (ft)	% TOC	wt% Carbonate
31-055-04502-00-00	950	0.30	16.69
31-055-04502-00-00	960	0.28	15.02
31-055-04502-00-00	970	0.31	16.10
31-055-04502-00-00	980	0.27	16.28
31-055-04502-00-00	990	0.26	16.06
31-055-04502-00-00	1000	0.23	16.98
31-055-04502-00-00	1010	0.32	18.37
31-055-04502-00-00	1020	0.30	15.36
31-055-04502-00-00	1030	0.38	13.79
31-055-04502-00-00	1040	0.31	14.19
31-055-04502-00-00	1050	0.37	15.57
31-055-04502-00-00	1060	0.41	15.21
31-055-04502-00-00	1070	0.36	15.92
31-055-04502-00-00	1080	0.39	15.58
31-055-04502-00-00	1090	0.51	15.44
31-055-04502-00-00	1100	0.35	15.31
31-055-04502-00-00	1110	0.39	15.13
31-055-04502-00-00	1120	0.36	13.96
31-055-04502-00-00	1130	0.40	17.37
31-055-04502-00-00	1140	0.76	23.57
31-055-04502-00-00	1150	0.79	50.10
31-055-04502-00-00	1160	0.79	50.26
Duplicates			
31-055-04502-00-00	1110-2	0.41	



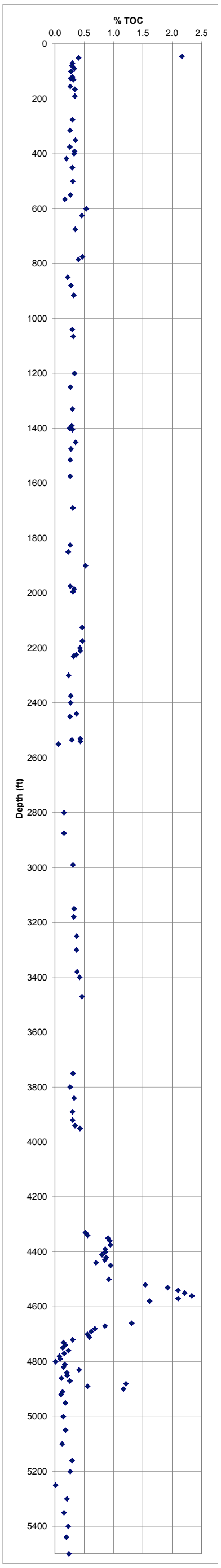
31-063-04719-00-00		
API	Depth (ft)	%TOC
31-063-04719-00-00	1050	0.20
31-063-04719-00-00	1060	0.24
31-063-04719-00-00	1070	0.23
31-063-04719-00-00	1080	0.28
31-063-04719-00-00	1090	0.31
31-063-04719-00-00	1100	0.20
31-063-04719-00-00	1110	0.28
31-063-04719-00-00	1120	0.26
31-063-04719-00-00	1130	0.26
31-063-04719-00-00	1140	0.30
31-063-04719-00-00	1150	0.33
31-063-04719-00-00	1160	0.25
31-063-04719-00-00	1170	0.24
31-063-04719-00-00	1180	0.25
31-063-04719-00-00	1190	0.27
31-063-04719-00-00	1200	0.24
31-063-04719-00-00	1210	0.31
31-063-04719-00-00	1220	0.24
31-063-04719-00-00	1230	0.27
31-063-04719-00-00	1240	0.39
31-063-04719-00-00	1250	0.58
31-063-04719-00-00	1260	0.56
31-063-04719-00-00	1270	0.55
31-063-04719-00-00	1280	0.37
31-063-04719-00-00	1290	0.35
31-063-04719-00-00	1300	0.34
Duplicates		
31-063-04719-00-00	1090-2	0.29
31-063-04719-00-00	1240-2	0.43



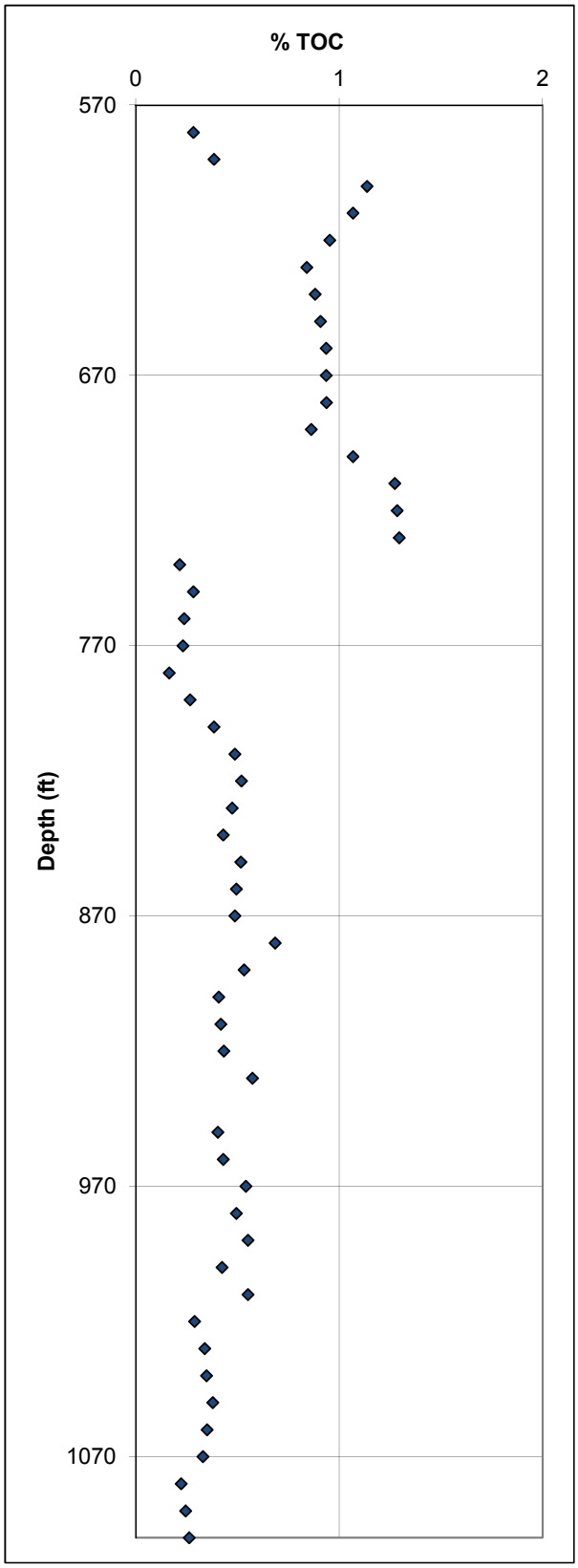
31-065-03928-00-00		
API	Depth (ft)	% TOC
31-065-03928-00-00	2800	0.55
31-065-03928-00-00	2810	0.56
31-065-03928-00-00	2830	1.15
31-065-03928-00-00	2850	1.16
31-065-03928-00-00	2860	1.13
31-065-03928-00-00	2880	1.36
31-065-03928-00-00	2890	1.29
31-065-03928-00-00	2910	1.15
31-065-03928-00-00	2920	1.41
31-065-03928-00-00	2930	1.26
31-065-03928-00-00	2950	1.49
31-065-03928-00-00	2960	1.55
31-065-03928-00-00	2980	1.84
31-065-03928-00-00	2990	2.26
31-065-03928-00-00	3000	2.32
31-065-03928-00-00	3010	2.31
31-065-03928-00-00	3020	2.45
31-065-03928-00-00	3030	2.46
31-065-03928-00-00	3040	2.11
31-065-03928-00-00	3050	2.73
31-065-03928-00-00	3060	2.41
31-065-03928-00-00	3070	2.40
31-065-03928-00-00	3080	2.45
31-065-03928-00-00	3090	2.52
31-065-03928-00-00	3100	2.24
31-065-03928-00-00	3110	2.40
31-065-03928-00-00	3120	2.21
31-065-03928-00-00	3130	2.19
31-065-03928-00-00	3140	2.16
31-065-03928-00-00	3150	2.60
31-065-03928-00-00	3160	2.14
31-065-03928-00-00	3170	2.18
31-065-03928-00-00	3180	1.85
31-065-03928-00-00	3190	1.85
31-065-03928-00-00	3200	1.42
31-065-03928-00-00	3210	1.45
31-065-03928-00-00	3220	1.19
31-065-03928-00-00	3230	1.02
31-065-03928-00-00	3240	0.97
31-065-03928-00-00	3250	1.06
31-065-03928-00-00	3270	1.10
31-065-03928-00-00	3280	0.93
31-065-03928-00-00	3290	0.95
31-065-03928-00-00	3300	0.60
31-065-03928-00-00	3310	0.39
31-065-03928-00-00	3320	0.88
31-065-03928-00-00	3330	0.79
31-065-03928-00-00	3340	0.61
31-065-03928-00-00	3350	0.64
31-065-03928-00-00	3360	0.82
31-065-03928-00-00	3370	0.79
31-065-03928-00-00	3380	1.02
31-065-03928-00-00	3390	1.03
31-065-03928-00-00	3400	0.62
31-065-03928-00-00	3410	0.79
31-065-03928-00-00	3420	0.52
31-065-03928-00-00	3430	0.46
31-065-03928-00-00	3440	0.28
31-065-03928-00-00	3450	0.53
31-065-03928-00-00	3460	0.26
31-065-03928-00-00	3470	0.28
31-065-03928-00-00	3480	0.25
31-065-03928-00-00	3490	0.33
Duplicates		
31-065-03928-00-00	3250-2	1.09



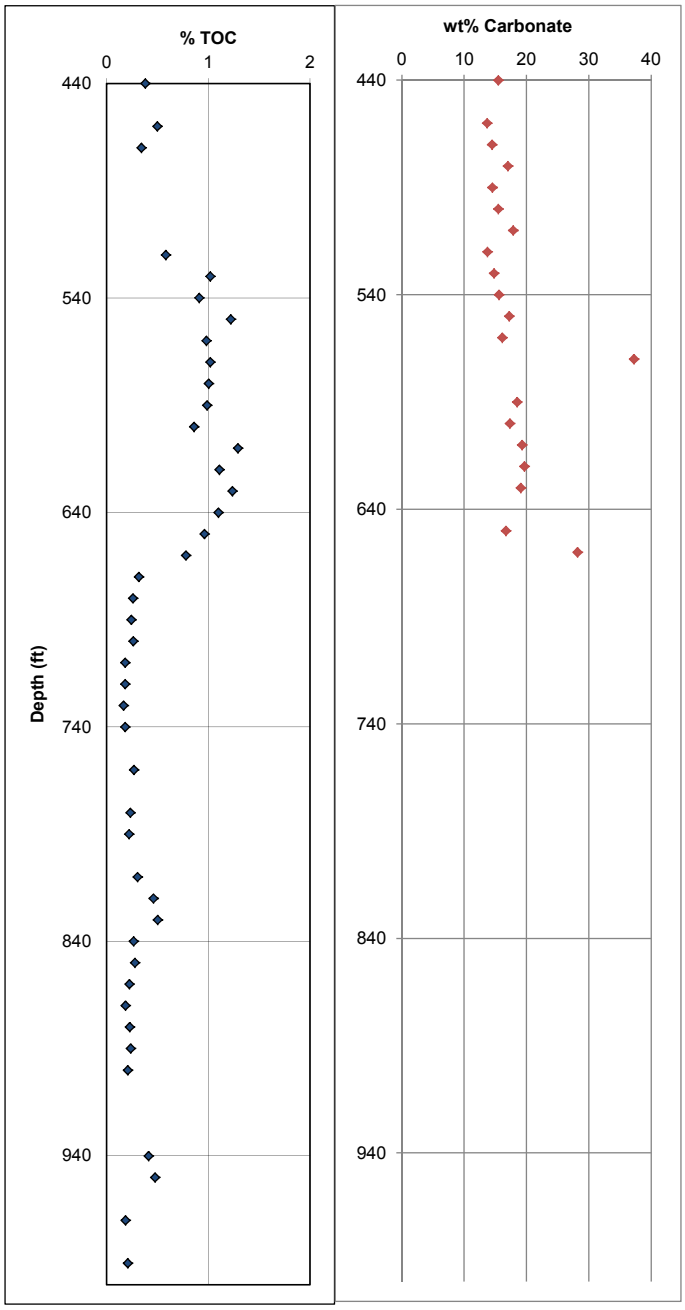
31-071-01001-00-00		
API	Depth (ft)	% TOC
31-071-01001-00-00	45	2.17
31-071-01001-00-00	50	0.40
31-071-01001-00-00	70	0.30
31-071-01001-00-00	80	0.29
31-071-01001-00-00	90	0.33
31-071-01001-00-00	100	0.27
31-071-01001-00-00	120	0.30
31-071-01001-00-00	125	0.27
31-071-01001-00-00	130	0.31
31-071-01001-00-00	155	0.26
31-071-01001-00-00	165	0.34
31-071-01001-00-00	190	0.34
31-071-01001-00-00	275	0.30
31-071-01001-00-00	315	0.26
31-071-01001-00-00	350	0.35
31-071-01001-00-00	375	0.26
31-071-01001-00-00	391	0.33
31-071-01001-00-00	400	0.33
31-071-01001-00-00	417	0.19
31-071-01001-00-00	450	0.29
31-071-01001-00-00	500	0.31
31-071-01001-00-00	550	0.26
31-071-01001-00-00	565	0.17
31-071-01001-00-00	600	0.53
31-071-01001-00-00	625	0.46
31-071-01001-00-00	675	0.35
31-071-01001-00-00	775	0.47
31-071-01001-00-00	785	0.40
31-071-01001-00-00	850	0.22
31-071-01001-00-00	880	0.27
31-071-01001-00-00	915	0.32
31-071-01001-00-00	1040	0.30
31-071-01001-00-00	1065	0.31
31-071-01001-00-00	1200	0.33
31-071-01001-00-00	1250	0.26
31-071-01001-00-00	1330	0.30
31-071-01001-00-00	1390	0.29
31-071-01001-00-00	1400	0.25
31-071-01001-00-00	1405	0.30
31-071-01001-00-00	1451	0.35
31-071-01001-00-00	1475	0.27
31-071-01001-00-00	1515	0.26
31-071-01001-00-00	1575	0.26
31-071-01001-00-00	1690	0.31
31-071-01001-00-00	1825	0.26
31-071-01001-00-00	1850	0.23
31-071-01001-00-00	1900	0.52
31-071-01001-00-00	1975	0.26
31-071-01001-00-00	1985	0.33
31-071-01001-00-00	1995	0.31
31-071-01001-00-00	2125	0.47
31-071-01001-00-00	2175	0.47
31-071-01001-00-00	2200	0.43
31-071-01001-00-00	2210	0.43
31-071-01001-00-00	2225	0.36
31-071-01001-00-00	2230	0.32
31-071-01001-00-00	2300	0.23
31-071-01001-00-00	2375	0.27
31-071-01001-00-00	2400	0.27
31-071-01001-00-00	2440	0.37
31-071-01001-00-00	2450	0.26
31-071-01001-00-00	2530	0.43
31-071-01001-00-00	2535	0.29
31-071-01001-00-00	2540	0.43
31-071-01001-00-00	2550	0.06
31-071-01001-00-00	2800	0.15
31-071-01001-00-00	2875	0.15
31-071-01001-00-00	2990	0.31
31-071-01001-00-00	3150	0.33
31-071-01001-00-00	3180	0.32
31-071-01001-00-00	3250	0.37
31-071-01001-00-00	3300	0.37
31-071-01001-00-00	3380	0.38
31-071-01001-00-00	3400	0.42
31-071-01001-00-00	3470	0.46
31-071-01001-00-00	3750	0.31
31-071-01001-00-00	3800	0.26
31-071-01001-00-00	3840	0.33
31-071-01001-00-00	3890	0.30
31-071-01001-00-00	3920	0.30
31-071-01001-00-00	3940	0.34
31-071-01001-00-00	3950	0.43
31-071-01001-00-00	4330	0.52
31-071-01001-00-00	4340	0.56
31-071-01001-00-00	4350	0.91
31-071-01001-00-00	4360	0.94
31-071-01001-00-00	4375	0.94
31-071-01001-00-00	4390	0.86
31-071-01001-00-00	4400	0.86
31-071-01001-00-00	4410	0.80
31-071-01001-00-00	4420	0.87
31-071-01001-00-00	4430	0.85
31-071-01001-00-00	4440	0.70
31-071-01001-00-00	4450	0.95
31-071-01001-00-00	4500	0.92
31-071-01001-00-00	4520	1.54
31-071-01001-00-00	4530	1.92
31-071-01001-00-00	4540	2.10
31-071-01001-00-00	4550	2.21
31-071-01001-00-00	4560	2.34
31-071-01001-00-00	4570	2.10
31-071-01001-00-00	4580	1.61
31-071-01001-00-00	4660	1.31
31-071-01001-00-00	4670	0.86
31-071-01001-00-00	4680	0.68
31-071-01001-00-00	4690	0.62
31-071-01001-00-00	4700	0.55
31-071-01001-00-00	4710	0.59
31-071-01001-00-00	4720	0.30
31-071-01001-00-00	4730	0.14
31-071-01001-00-00	4740	0.17
31-071-01001-00-00	4750	0.13
31-071-01001-00-00	4760	0.23
31-071-01001-00-00	4770	0.16
31-071-01001-00-00	4780	0.08
31-071-01001-00-00	4790	0.09
31-071-01001-00-00	4800	0.01
31-071-01001-00-00	4810	0.17
31-071-01001-00-00	4820	0.15
31-071-01001-00-00	4830	0.41
31-071-01001-00-00	4840	0.20
31-071-01001-00-00	4850	0.21
31-071-01001-00-00	4860	0.11
31-071-01001-00-00	4870	0.25
31-071-01001-00-00	4880	1.21
31-071-01001-00-00	4890	0.56
31-071-01001-00-00	4900	1.17
31-071-01001-00-00	4910	0.13
31-071-01001-00-00	4920	0.10
31-071-01001-00-00	4950	0.18
31-071-01001-00-00	5000	0.14
31-071-01001-00-00	5050	0.18
31-071-01001-00-00	5100	0.12
31-071-01001-00-00	5160	0.29
31-071-01001-00-00	5200	0.26
31-071-01001-00-00	5250	0.01
31-071-01001-00-00	5300	0.20
31-071-01001-00-00	5350	0.16
31-071-01001-00-00	5400	0.23
31-071-01001-00-00	5440	0.20
31-071-01001-00-00	5500	0.24
Duplicates		
31-071-01001-00-00	4440-2	0.69
31-071-01001-00-00	4760-2	0.25
31-071-01001-00-00	4910-2	0.19
31-071-01001-00-00	3840-2	0.33



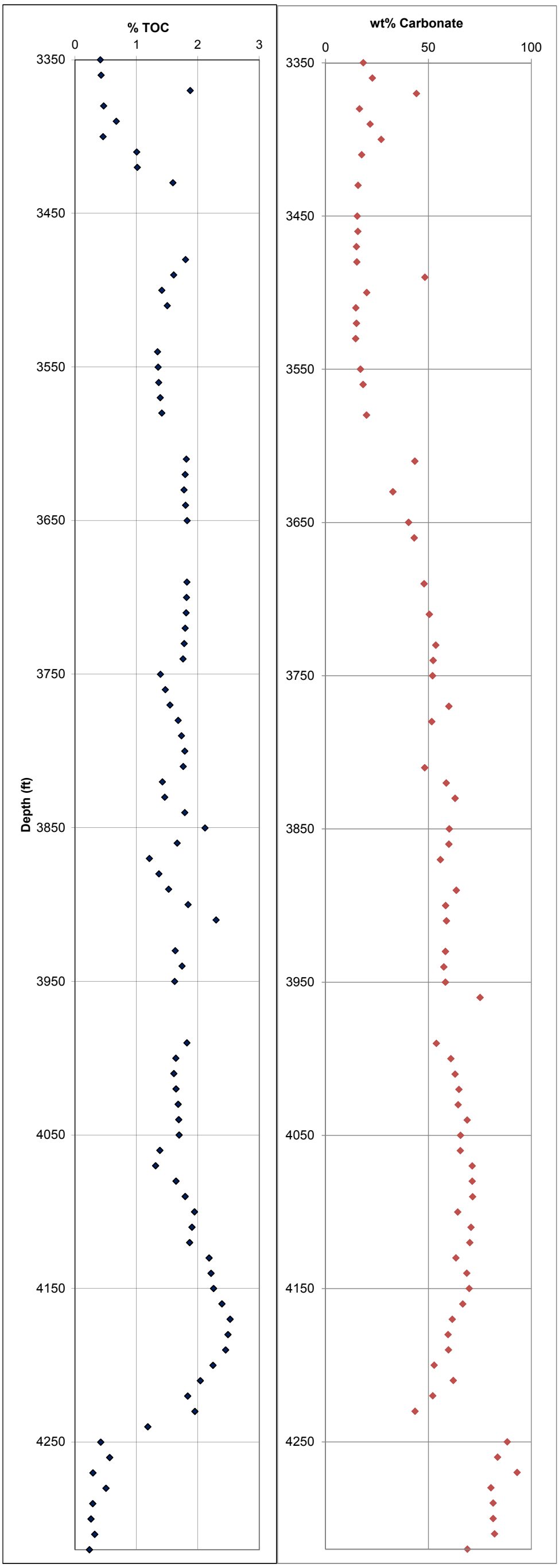
31-075-12399-00-00		
API	Depth (ft)	% TOC
31-075-12399-00-00	580	0.28
31-075-12399-00-00	590	0.38
31-075-12399-00-00	600	1.14
31-075-12399-00-00	610	1.07
31-075-12399-00-00	620	0.95
31-075-12399-00-00	630	0.84
31-075-12399-00-00	640	0.88
31-075-12399-00-00	650	0.91
31-075-12399-00-00	660	0.93
31-075-12399-00-00	670	0.94
31-075-12399-00-00	680	0.94
31-075-12399-00-00	690	0.86
31-075-12399-00-00	700	1.07
31-075-12399-00-00	710	1.27
31-075-12399-00-00	720	1.28
31-075-12399-00-00	730	1.29
31-075-12399-00-00	740	0.22
31-075-12399-00-00	750	0.28
31-075-12399-00-00	760	0.24
31-075-12399-00-00	770	0.23
31-075-12399-00-00	780	0.16
31-075-12399-00-00	790	0.27
31-075-12399-00-00	800	0.38
31-075-12399-00-00	810	0.49
31-075-12399-00-00	820	0.52
31-075-12399-00-00	830	0.47
31-075-12399-00-00	840	0.43
31-075-12399-00-00	850	0.52
31-075-12399-00-00	860	0.49
31-075-12399-00-00	870	0.49
31-075-12399-00-00	880	0.68
31-075-12399-00-00	890	0.53
31-075-12399-00-00	900	0.41
31-075-12399-00-00	910	0.42
31-075-12399-00-00	920	0.43
31-075-12399-00-00	930	0.57
31-075-12399-00-00	940	
31-075-12399-00-00	950	0.40
31-075-12399-00-00	960	0.43
31-075-12399-00-00	970	0.54
31-075-12399-00-00	980	0.49
31-075-12399-00-00	990	0.55
31-075-12399-00-00	1000	0.42
31-075-12399-00-00	1010	0.55
31-075-12399-00-00	1020	0.29
31-075-12399-00-00	1030	0.34
31-075-12399-00-00	1040	0.35
31-075-12399-00-00	1050	0.38
31-075-12399-00-00	1060	0.35
31-075-12399-00-00	1070	0.33
31-075-12399-00-00	1080	0.22
31-075-12399-00-00	1090	0.24
31-075-12399-00-00	1100	0.26
Duplicates		
31-075-12399-00-00	730-2	1.32



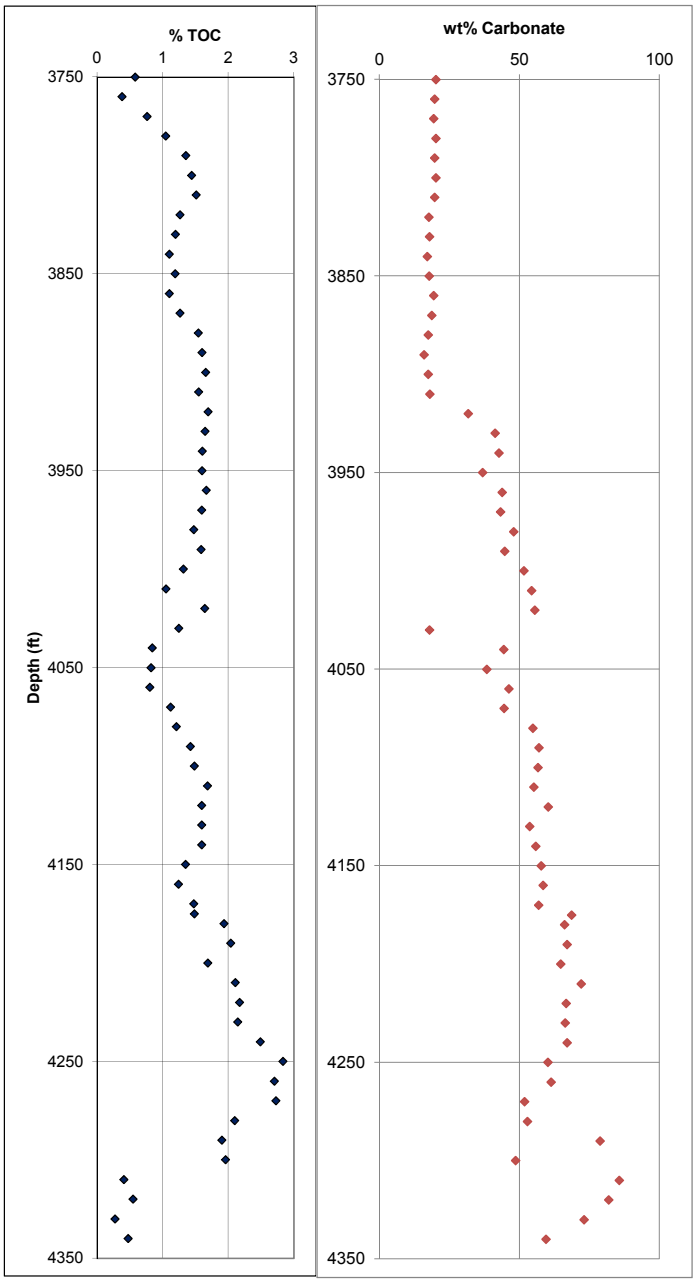
31-075-12447-00-00			
API	Depth (ft)	% TOC	wt% Carbonate
31-075-12447-00-00	440	0.38	15.46
31-075-12447-00-00	450		
31-075-12447-00-00	460	0.50	13.65
31-075-12447-00-00	470	0.34	14.47
31-075-12447-00-00	480		17.01
31-075-12447-00-00	490		14.53
31-075-12447-00-00	500		15.45
31-075-12447-00-00	510		17.86
31-075-12447-00-00	520	0.58	13.72
31-075-12447-00-00	530	1.02	14.77
31-075-12447-00-00	540	0.91	15.55
31-075-12447-00-00	550	1.22	17.20
31-075-12447-00-00	560	0.98	16.11
31-075-12447-00-00	570	1.02	37.26
31-075-12447-00-00	580	1.00	
31-075-12447-00-00	590	0.99	18.48
31-075-12447-00-00	600	0.86	17.35
31-075-12447-00-00	610	1.29	19.29
31-075-12447-00-00	620	1.11	19.64
31-075-12447-00-00	630	1.23	19.09
31-075-12447-00-00	640	1.10	
31-075-12447-00-00	650	0.96	16.68
31-075-12447-00-00	660	0.78	28.20
31-075-12447-00-00	670	0.32	
31-075-12447-00-00	680	0.26	
31-075-12447-00-00	690	0.24	
31-075-12447-00-00	700	0.26	
31-075-12447-00-00	710	0.18	
31-075-12447-00-00	720	0.18	
31-075-12447-00-00	730	0.17	
31-075-12447-00-00	740	0.18	
31-075-12447-00-00	750		
31-075-12447-00-00	760	0.27	
31-075-12447-00-00	770		
31-075-12447-00-00	780	0.23	
31-075-12447-00-00	790	0.22	
31-075-12447-00-00	800		
31-075-12447-00-00	810	0.30	
31-075-12447-00-00	820	0.46	
31-075-12447-00-00	830	0.50	
31-075-12447-00-00	840	0.26	
31-075-12447-00-00	850	0.28	
31-075-12447-00-00	860	0.22	
31-075-12447-00-00	870	0.19	
31-075-12447-00-00	880	0.23	
31-075-12447-00-00	890	0.24	
31-075-12447-00-00	900	0.21	
31-075-12447-00-00	910		
31-075-12447-00-00	920		
31-075-12447-00-00	930		
31-075-12447-00-00	940	0.41	
31-075-12447-00-00	950	0.47	
31-075-12447-00-00	960		
31-075-12447-00-00	970	0.19	
31-075-12447-00-00	980	4.86	
31-075-12447-00-00	990	0.21	
31-075-12447-00-00	1000	0.38	
Duplicates			
31-075-12447-00-00	660-2	0.79	



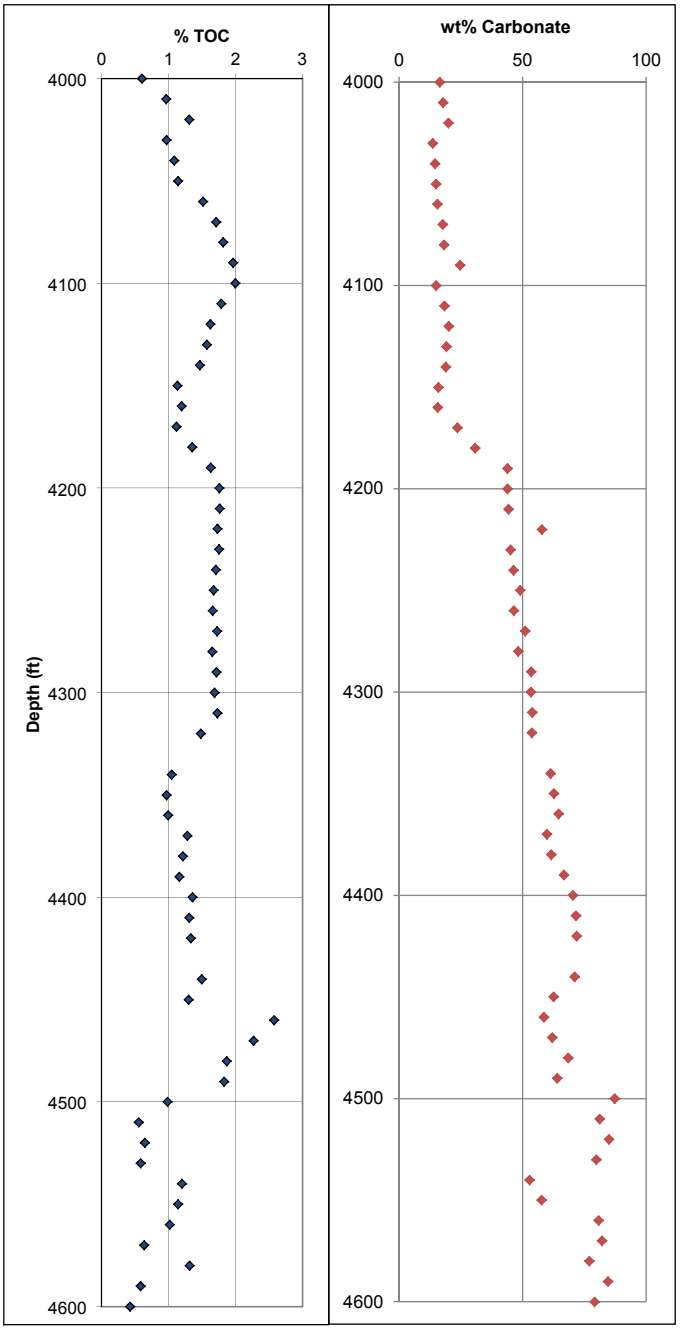
31-077-04055-00-00			
API	Depth (ft)	% TOC	wt% Carbonate
31-077-04055-00-00	3350	0.41	18.28
31-077-04055-00-00	3360	0.43	22.70
31-077-04055-00-00	3370	1.88	44.12
31-077-04055-00-00	3380	0.47	16.43
31-077-04055-00-00	3390	0.67	21.62
31-077-04055-00-00	3400	0.46	27.04
31-077-04055-00-00	3410	1.00	17.49
31-077-04055-00-00	3420	1.02	
31-077-04055-00-00	3430	1.59	15.76
31-077-04055-00-00	3440	1.27	
31-077-04055-00-00	3450	1.39	15.37
31-077-04055-00-00	3460	1.51	15.62
31-077-04055-00-00	3470	1.35	14.96
31-077-04055-00-00	3480	1.80	15.10
31-077-04055-00-00	3490	1.61	48.22
31-077-04055-00-00	3500	1.41	19.97
31-077-04055-00-00	3510	1.50	14.67
31-077-04055-00-00	3520	1.55	14.98
31-077-04055-00-00	3530	1.61	14.59
31-077-04055-00-00	3540	1.34	
31-077-04055-00-00	3550	1.35	16.87
31-077-04055-00-00	3560	1.36	18.16
31-077-04055-00-00	3570	1.39	
31-077-04055-00-00	3580	1.41	19.83
31-077-04055-00-00	3590	1.50	
31-077-04055-00-00	3600	1.61	
31-077-04055-00-00	3610	1.81	43.32
31-077-04055-00-00	3620	1.79	
31-077-04055-00-00	3630	1.77	32.65
31-077-04055-00-00	3640	1.80	
31-077-04055-00-00	3650	1.82	40.28
31-077-04055-00-00	3660		43.08
31-077-04055-00-00	3670		
31-077-04055-00-00	3680		
31-077-04055-00-00	3690	1.82	47.83
31-077-04055-00-00	3700	1.82	
31-077-04055-00-00	3710	1.81	50.37
31-077-04055-00-00	3720	1.79	
31-077-04055-00-00	3730	1.78	53.50
31-077-04055-00-00	3740	1.76	52.25
31-077-04055-00-00	3750	1.39	51.97
31-077-04055-00-00	3760	1.47	
31-077-04055-00-00	3770	1.55	59.86
31-077-04055-00-00	3780	1.68	51.60
31-077-04055-00-00	3790	1.73	
31-077-04055-00-00	3800	1.79	
31-077-04055-00-00	3810	1.76	48.09
31-077-04055-00-00	3820	1.42	58.60
31-077-04055-00-00	3830	1.46	62.94
31-077-04055-00-00	3840	1.79	
31-077-04055-00-00	3850	2.12	60.02
31-077-04055-00-00	3860	1.66	59.85
31-077-04055-00-00	3870	1.21	55.80
31-077-04055-00-00	3880	1.37	
31-077-04055-00-00	3890	1.52	63.52
31-077-04055-00-00	3900	1.84	58.33
31-077-04055-00-00	3910	2.30	58.73
31-077-04055-00-00	3930	1.63	58.25
31-077-04055-00-00	3940	1.74	57.39
31-077-04055-00-00	3950	1.62	58.23
31-077-04055-00-00	3960		75.08
31-077-04055-00-00	3970		
31-077-04055-00-00	3980		
31-077-04055-00-00	3990	1.82	53.83
31-077-04055-00-00	4000	1.64	60.81
31-077-04055-00-00	4010	1.61	62.88
31-077-04055-00-00	4020	1.65	64.73
31-077-04055-00-00	4030	1.68	64.37
31-077-04055-00-00	4040	1.69	68.77
31-077-04055-00-00	4050	1.70	65.59
31-077-04055-00-00	4060	1.38	65.47
31-077-04055-00-00	4070	1.31	71.26
31-077-04055-00-00	4080	1.64	71.23
31-077-04055-00-00	4090	1.79	71.42
31-077-04055-00-00	4100	1.95	64.17
31-077-04055-00-00	4110	1.90	70.62
31-077-04055-00-00	4120	1.87	70.05
31-077-04055-00-00	4130	2.18	63.29
31-077-04055-00-00	4140	2.21	68.57
31-077-04055-00-00	4150	2.26	69.73
31-077-04055-00-00	4160	2.39	66.67
31-077-04055-00-00	4170	2.53	61.53
31-077-04055-00-00	4180	2.49	59.45
31-077-04055-00-00	4190	2.45	59.68
31-077-04055-00-00	4200	2.25	52.68
31-077-04055-00-00	4210	2.04	62.01
31-077-04055-00-00	4220	1.84	52.07
31-077-04055-00-00	4230	1.95	43.46
31-077-04055-00-00	4240	1.19	
31-077-04055-00-00	4250	0.42	88.27
31-077-04055-00-00	4260	0.56	83.53
31-077-04055-00-00	4270	0.29	93.00
31-077-04055-00-00	4280	0.51	80.28
31-077-04055-00-00	4290	0.29	81.36
31-077-04055-00-00	4300	0.26	81.41
31-077-04055-00-00	4310	0.32	82.04
31-077-04055-00-00	4320	0.24	68.86
Duplicates			
31-077-04055-00-00	3560-2	1.36	
31-077-04055-00-00	3780-2	1.70	
31-077-04055-00-00	4060-2	1.39	
31-077-04055-00-00	4320-2	0.29	



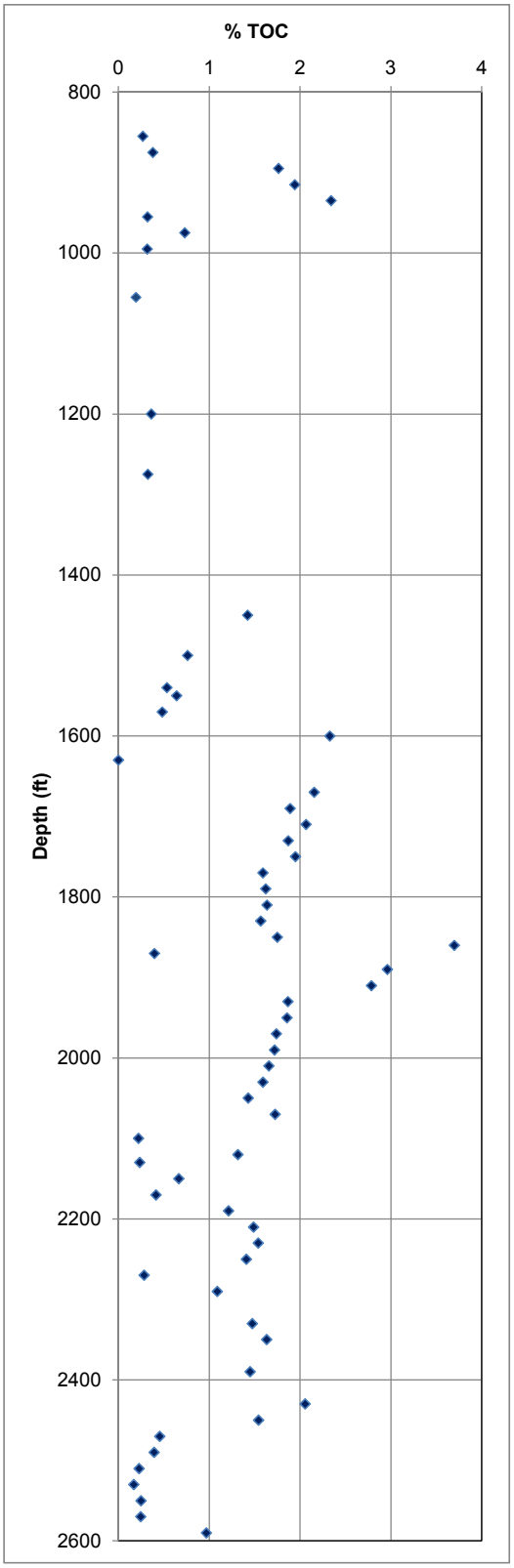
31-077-04547-00-00			
API	Depth (ft)	% TOC	wt% Carbonate
31-077-04547-00-00	3750	0.58	20.17
31-077-04547-00-00	3760	0.38	19.65
31-077-04547-00-00	3770	0.76	19.37
31-077-04547-00-00	3780	1.05	20.11
31-077-04547-00-00	3790	1.35	19.70
31-077-04547-00-00	3800	1.44	20.15
31-077-04547-00-00	3810	1.51	19.70
31-077-04547-00-00	3820	1.27	17.60
31-077-04547-00-00	3830	1.20	17.83
31-077-04547-00-00	3840	1.10	17.07
31-077-04547-00-00	3850	1.19	17.76
31-077-04547-00-00	3860	1.10	19.33
31-077-04547-00-00	3870	1.27	18.67
31-077-04547-00-00	3880	1.55	17.41
31-077-04547-00-00	3890	1.60	15.97
31-077-04547-00-00	3900	1.66	17.37
31-077-04547-00-00	3910	1.55	17.95
31-077-04547-00-00	3920	1.69	31.69
31-077-04547-00-00	3930	1.65	41.35
31-077-04547-00-00	3940	1.60	42.62
31-077-04547-00-00	3950	1.60	36.87
31-077-04547-00-00	3960	1.67	43.84
31-077-04547-00-00	3970	1.60	43.20
31-077-04547-00-00	3980	1.47	47.92
31-077-04547-00-00	3990	1.58	44.75
31-077-04547-00-00	4000	1.32	51.52
31-077-04547-00-00	4010	1.05	54.36
31-077-04547-00-00	4020	1.64	55.50
31-077-04547-00-00	4030	1.24	17.86
31-077-04547-00-00	4040	0.84	44.34
31-077-04547-00-00	4050	0.82	38.30
31-077-04547-00-00	4060	0.81	46.21
31-077-04547-00-00	4070	1.12	44.51
31-077-04547-00-00	4080	1.21	54.76
31-077-04547-00-00	4090	1.42	57.00
31-077-04547-00-00	4100	1.49	56.61
31-077-04547-00-00	4110	1.68	55.07
31-077-04547-00-00	4120	1.60	60.31
31-077-04547-00-00	4130	1.60	53.66
31-077-04547-00-00	4140	1.60	55.86
31-077-04547-00-00	4150	1.35	57.76
31-077-04547-00-00	4160	1.24	58.46
31-077-04547-00-00	4170	1.47	56.89
31-077-04547-00-00	4175	1.48	68.59
31-077-04547-00-00	4180	1.94	66.10
31-077-04547-00-00	4190	2.04	66.96
31-077-04547-00-00	4200	1.69	64.76
31-077-04547-00-00	4210	2.11	72.07
31-077-04547-00-00	4220	2.17	66.65
31-077-04547-00-00	4230	2.15	66.33
31-077-04547-00-00	4240	2.49	67.05
31-077-04547-00-00	4250	2.83	60.11
31-077-04547-00-00	4260	2.70	61.25
31-077-04547-00-00	4270	2.73	51.83
31-077-04547-00-00	4280	2.10	52.78
31-077-04547-00-00	4290	1.90	78.80
31-077-04547-00-00	4300	1.96	48.65
31-077-04547-00-00	4310	0.41	85.61
31-077-04547-00-00	4320	0.55	81.81
31-077-04547-00-00	4330	0.28	73.10
31-077-04547-00-00	4340	0.47	59.51
Duplicates			
31-077-04547-00-00	3800-2	1.39	
31-077-04547-00-00	3868-2	1.09	
31-077-04547-00-00	3960-2	1.64	
31-077-04547-00-00	4101-2	1.44	
31-077-04547-00-00	4180-2	1.93	
31-077-04547-00-00	4250-2	2.79	



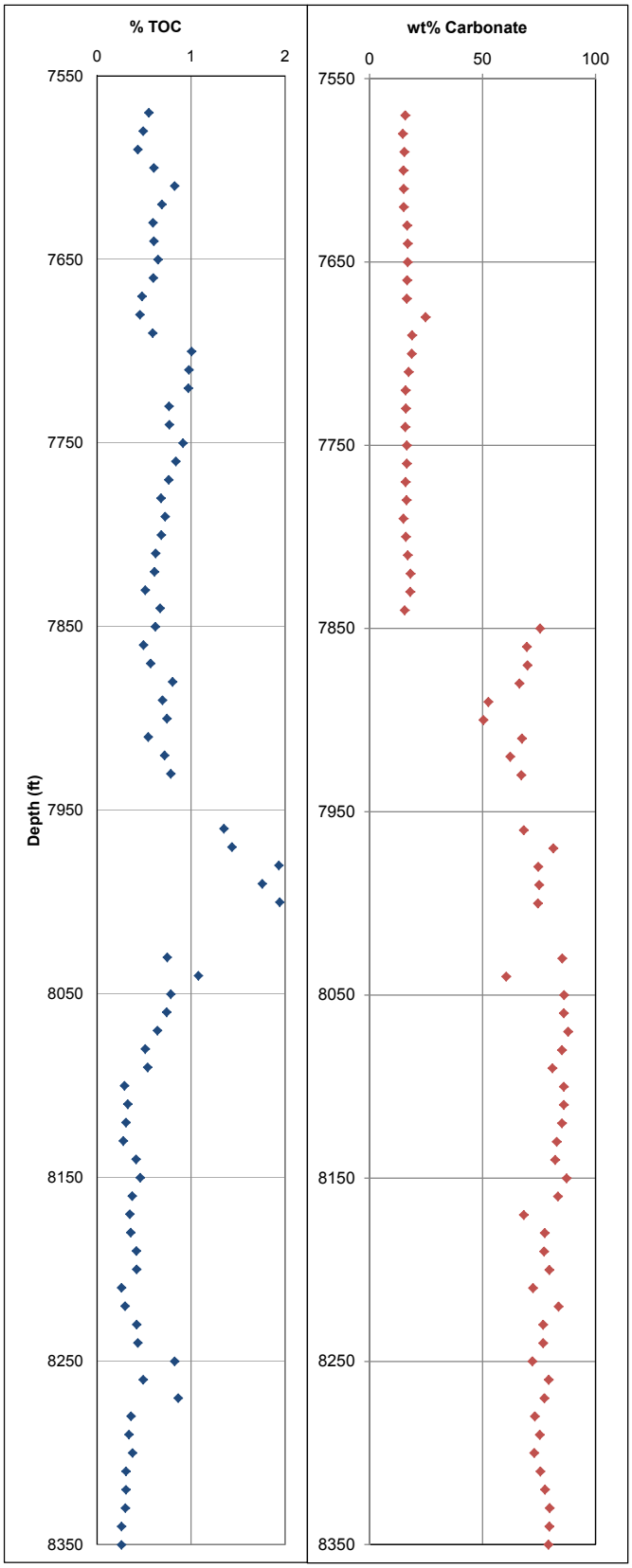
31-077-10834-00-00			
API	Depth (ft)	% TOC	wt% Carbonate
31-077-10834-00-00	4000	0.60	16.52
31-077-10834-00-00	4010	0.97	17.83
31-077-10834-00-00	4020	1.31	20.00
31-077-10834-00-00	4030	0.97	13.62
31-077-10834-00-00	4040	1.08	14.60
31-077-10834-00-00	4050	1.14	14.99
31-077-10834-00-00	4060	1.52	15.53
31-077-10834-00-00	4070	1.71	17.73
31-077-10834-00-00	4080	1.81	18.27
31-077-10834-00-00	4090	1.97	24.79
31-077-10834-00-00	4100	2.00	14.96
31-077-10834-00-00	4110	1.79	18.34
31-077-10834-00-00	4120	1.62	20.10
31-077-10834-00-00	4130	1.57	19.18
31-077-10834-00-00	4140	1.47	18.97
31-077-10834-00-00	4150	1.13	15.92
31-077-10834-00-00	4160	1.20	15.74
31-077-10834-00-00	4170	1.12	23.72
31-077-10834-00-00	4180	1.36	30.88
31-077-10834-00-00	4190	1.63	43.86
31-077-10834-00-00	4200	1.76	43.87
31-077-10834-00-00	4210	1.76	44.27
31-077-10834-00-00	4220	1.73	57.84
31-077-10834-00-00	4230	1.76	45.18
31-077-10834-00-00	4240	1.71	46.41
31-077-10834-00-00	4250	1.67	49.09
31-077-10834-00-00	4260	1.66	46.50
31-077-10834-00-00	4270	1.73	51.04
31-077-10834-00-00	4280	1.65	48.20
31-077-10834-00-00	4290	1.72	53.47
31-077-10834-00-00	4300	1.69	53.41
31-077-10834-00-00	4310	1.73	53.86
31-077-10834-00-00	4320	1.48	53.82
31-077-10834-00-00	4340	1.05	61.36
31-077-10834-00-00	4350	0.97	62.69
31-077-10834-00-00	4360	0.99	64.65
31-077-10834-00-00	4370	1.28	59.93
31-077-10834-00-00	4380	1.21	61.66
31-077-10834-00-00	4390	1.16	66.77
31-077-10834-00-00	4400	1.36	70.45
31-077-10834-00-00	4410	1.31	71.58
31-077-10834-00-00	4420	1.33	71.92
31-077-10834-00-00	4440	1.50	71.09
31-077-10834-00-00	4450	1.30	62.58
31-077-10834-00-00	4460	2.58	58.59
31-077-10834-00-00	4470	2.27	62.02
31-077-10834-00-00	4480	1.87	68.56
31-077-10834-00-00	4490	1.83	64.05
31-077-10834-00-00	4500	0.98	87.25
31-077-10834-00-00	4510	0.56	81.24
31-077-10834-00-00	4520	0.65	84.97
31-077-10834-00-00	4530	0.58	79.79
31-077-10834-00-00	4540	1.20	52.83
31-077-10834-00-00	4550	1.14	57.75
31-077-10834-00-00	4560	1.02	80.85
31-077-10834-00-00	4570	0.64	82.11
31-077-10834-00-00	4580	1.32	77.07
31-077-10834-00-00	4590	0.58	84.63
31-077-10834-00-00	4600	0.43	79.17



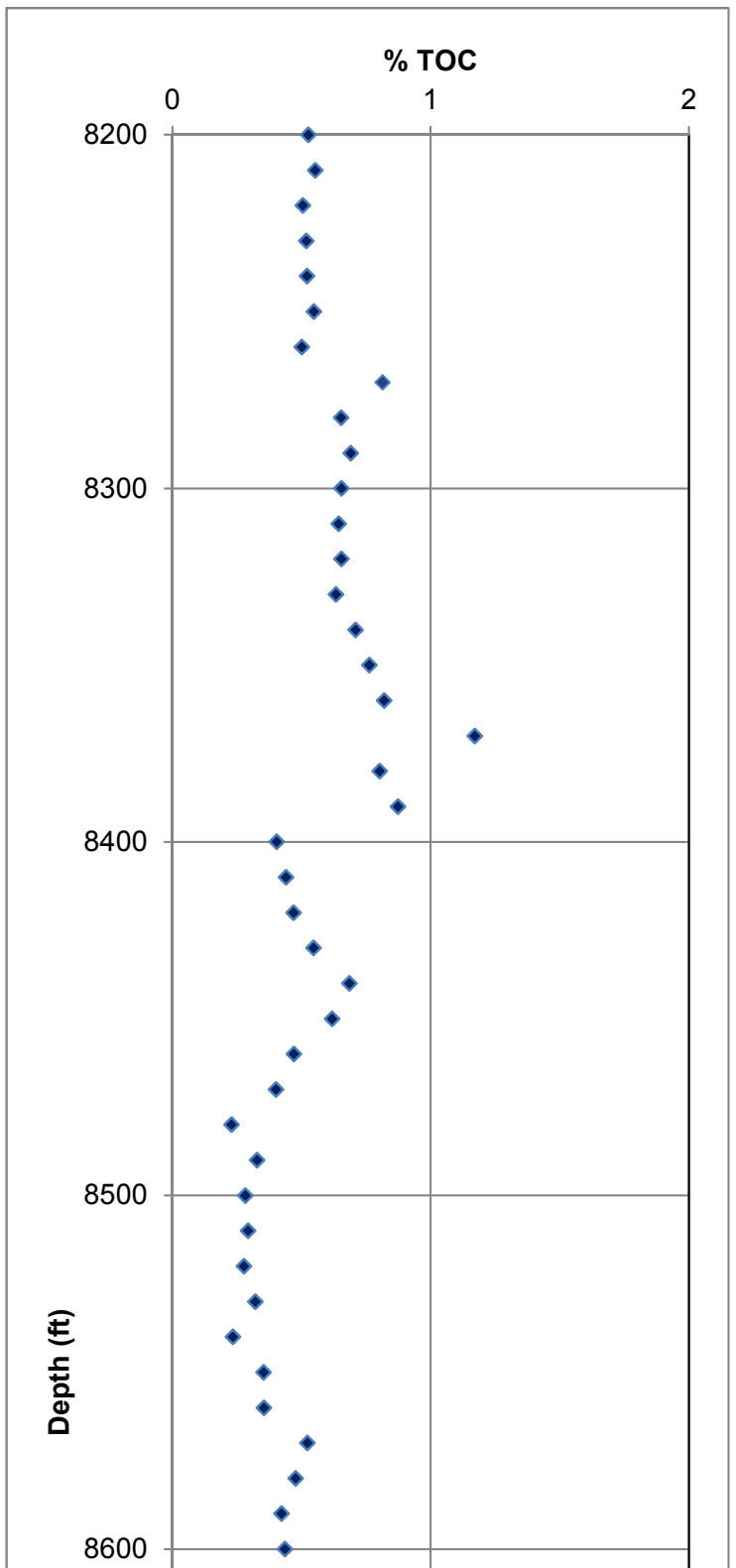
31-077-23759-00-00		
API	Depth (ft)	% TOC
31-077-23759-00-00	855	0.27
31-077-23759-00-00	875	0.38
31-077-23759-00-00	895	1.76
31-077-23759-00-00	915	1.94
31-077-23759-00-00	935	2.34
31-077-23759-00-00	955	0.32
31-077-23759-00-00	975	0.73
31-077-23759-00-00	995	0.32
31-077-23759-00-00	1055	0.19
31-077-23759-00-00	1200	0.36
31-077-23759-00-00	1275	0.33
31-077-23759-00-00	1450	1.42
31-077-23759-00-00	1500	0.76
31-077-23759-00-00	1540	0.54
31-077-23759-00-00	1550	0.64
31-077-23759-00-00	1570	0.48
31-077-23759-00-00	1600	2.33
31-077-23759-00-00	1630	0.00
31-077-23759-00-00	1670	2.16
31-077-23759-00-00	1690	1.89
31-077-23759-00-00	1710	2.07
31-077-23759-00-00	1730	1.87
31-077-23759-00-00	1750	1.95
31-077-23759-00-00	1770	1.59
31-077-23759-00-00	1790	1.62
31-077-23759-00-00	1810	1.63
31-077-23759-00-00	1830	1.57
31-077-23759-00-00	1850	1.75
31-077-23759-00-00	1860	3.70
31-077-23759-00-00	1870	0.40
31-077-23759-00-00	1890	2.96
31-077-23759-00-00	1910	2.78
31-077-23759-00-00	1930	1.86
31-077-23759-00-00	1950	1.85
31-077-23759-00-00	1970	1.74
31-077-23759-00-00	1990	1.72
31-077-23759-00-00	2010	1.66
31-077-23759-00-00	2030	1.59
31-077-23759-00-00	2050	1.43
31-077-23759-00-00	2070	1.72
31-077-23759-00-00	2100	0.22
31-077-23759-00-00	2120	1.31
31-077-23759-00-00	2130	0.23
31-077-23759-00-00	2150	0.66
31-077-23759-00-00	2170	0.41
31-077-23759-00-00	2190	1.21
31-077-23759-00-00	2210	1.49
31-077-23759-00-00	2230	1.54
31-077-23759-00-00	2250	1.41
31-077-23759-00-00	2270	0.28
31-077-23759-00-00	2290	1.09
31-077-23759-00-00	2330	1.47
31-077-23759-00-00	2350	1.63
31-077-23759-00-00	2390	1.45
31-077-23759-00-00	2430	2.05
31-077-23759-00-00	2450	1.54
31-077-23759-00-00	2470	0.45
31-077-23759-00-00	2490	0.39
31-077-23759-00-00	2510	0.23
31-077-23759-00-00	2530	0.17
31-077-23759-00-00	2550	0.25
31-077-23759-00-00	2570	0.24
31-077-23759-00-00	2590	0.97
Duplicates		
31-077-23759-00-00	1450-2	1.46
31-077-23759-00-00	1810-2	1.65
31-077-23759-00-00	2070-2	1.75



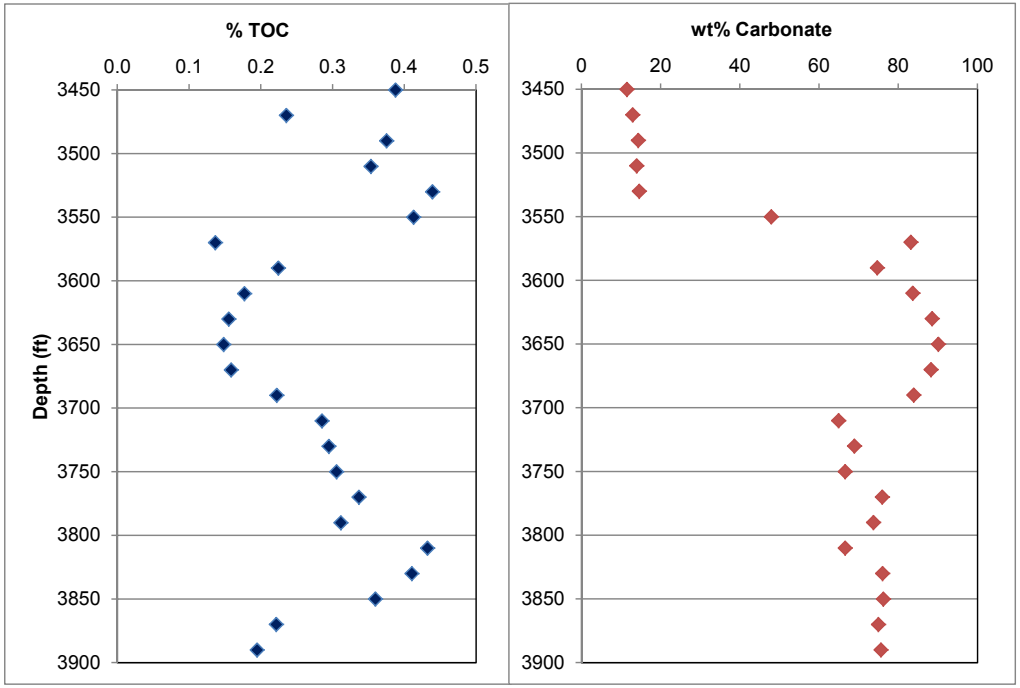
31-097-22935-00-00			
API	Depth (ft)	% TOC	wt% Carbonate
31-097-22935-00-00	7570	0.55	15.78
31-097-22935-00-00	7580	0.49	14.76
31-097-22935-00-00	7590	0.43	15.36
31-097-22935-00-00	7600	0.60	14.97
31-097-22935-00-00	7610	0.82	15.11
31-097-22935-00-00	7620	0.69	15.16
31-097-22935-00-00	7630	0.60	16.63
31-097-22935-00-00	7640	0.61	16.85
31-097-22935-00-00	7650	0.65	16.86
31-097-22935-00-00	7660	0.60	16.68
31-097-22935-00-00	7670	0.48	16.47
31-097-22935-00-00	7680	0.45	24.78
31-097-22935-00-00	7690	0.59	18.79
31-097-22935-00-00	7700	1.01	18.67
31-097-22935-00-00	7710	0.98	17.34
31-097-22935-00-00	7720	0.97	16.00
31-097-22935-00-00	7730	0.77	16.06
31-097-22935-00-00	7740	0.77	15.85
31-097-22935-00-00	7750	0.91	16.50
31-097-22935-00-00	7760	0.84	16.46
31-097-22935-00-00	7770	0.76	15.89
31-097-22935-00-00	7780	0.68	16.40
31-097-22935-00-00	7790	0.73	15.04
31-097-22935-00-00	7800	0.68	16.08
31-097-22935-00-00	7810	0.62	16.86
31-097-22935-00-00	7820	0.61	18.08
31-097-22935-00-00	7830	0.51	18.01
31-097-22935-00-00	7840	0.67	15.55
31-097-22935-00-00	7850	0.62	75.50
31-097-22935-00-00	7860	0.49	69.62
31-097-22935-00-00	7870	0.57	69.84
31-097-22935-00-00	7880	0.80	66.34
31-097-22935-00-00	7890	0.69	52.54
31-097-22935-00-00	7900	0.74	50.35
31-097-22935-00-00	7910	0.54	67.36
31-097-22935-00-00	7920	0.72	62.19
31-097-22935-00-00	7930	0.78	67.12
31-097-22935-00-00	7960	1.35	68.22
31-097-22935-00-00	7970	1.43	81.34
31-097-22935-00-00	7980	1.93	74.63
31-097-22935-00-00	7990	1.76	75.01
31-097-22935-00-00	8000	1.94	74.47
31-097-22935-00-00	8030	0.75	85.26
31-097-22935-00-00	8040	1.08	60.40
31-097-22935-00-00	8050	0.78	86.12
31-097-22935-00-00	8060	0.74	85.88
31-097-22935-00-00	8070	0.64	87.85
31-097-22935-00-00	8080	0.51	85.18
31-097-22935-00-00	8090	0.54	80.94
31-097-22935-00-00	8100	0.29	85.99
31-097-22935-00-00	8110	0.33	85.91
31-097-22935-00-00	8120	0.31	85.05
31-097-22935-00-00	8130	0.28	82.87
31-097-22935-00-00	8140	0.41	82.17
31-097-22935-00-00	8150	0.46	87.19
31-097-22935-00-00	8160	0.37	83.39
31-097-22935-00-00	8170	0.35	68.26
31-097-22935-00-00	8180	0.36	77.49
31-097-22935-00-00	8190	0.42	77.15
31-097-22935-00-00	8200	0.42	79.49
31-097-22935-00-00	8210	0.26	72.36
31-097-22935-00-00	8220	0.30	83.61
31-097-22935-00-00	8230	0.42	76.80
31-097-22935-00-00	8240	0.43	76.77
31-097-22935-00-00	8250	0.83	72.05
31-097-22935-00-00	8260	0.49	79.26
31-097-22935-00-00	8270	0.86	77.33
31-097-22935-00-00	8280	0.36	73.14
31-097-22935-00-00	8290	0.34	75.33
31-097-22935-00-00	8300	0.38	72.84
31-097-22935-00-00	8310	0.31	75.58
31-097-22935-00-00	8320	0.31	77.68
31-097-22935-00-00	8330	0.30	79.66
31-097-22935-00-00	8340	0.26	79.48
31-097-22935-00-00	8350	0.26	79.19
Duplicates			
31-097-22935-00-00	7660-2	0.57	
31-097-22935-00-00	8120-2	0.30	



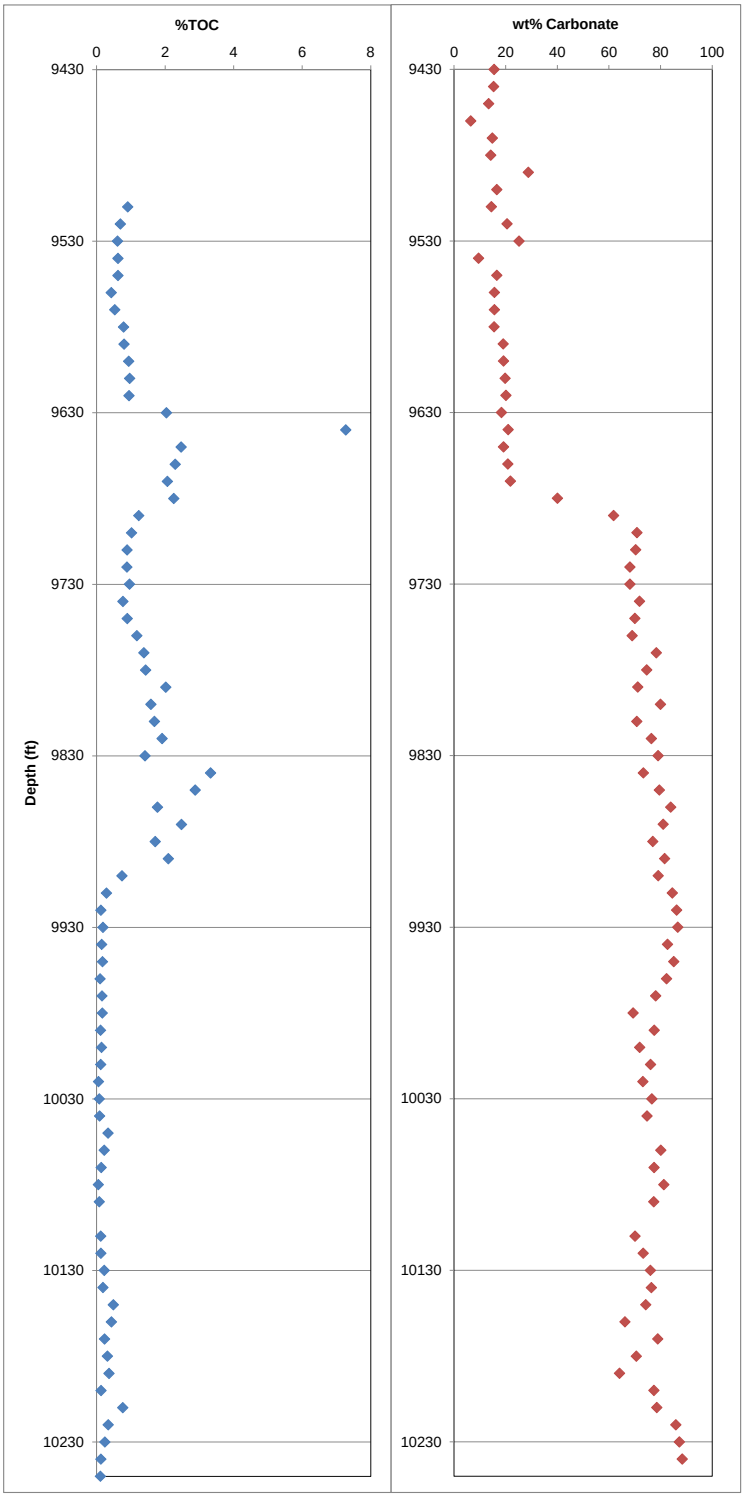
31-097-26017-00-00		
API	Depth (ft)	% TOC
31-097-26017-00-00	8200	0.53
31-097-26017-00-00	8210	0.55
31-097-26017-00-00	8220	0.51
31-097-26017-00-00	8230	0.52
31-097-26017-00-00	8240	0.52
31-097-26017-00-00	8250	0.55
31-097-26017-00-00	8260	0.50
31-097-26017-00-00	8270	0.81
31-097-26017-00-00	8280	0.65
31-097-26017-00-00	8290	0.69
31-097-26017-00-00	8300	0.65
31-097-26017-00-00	8310	0.64
31-097-26017-00-00	8320	0.66
31-097-26017-00-00	8330	0.63
31-097-26017-00-00	8340	0.71
31-097-26017-00-00	8350	0.76
31-097-26017-00-00	8360	0.82
31-097-26017-00-00	8370	1.17
31-097-26017-00-00	8380	0.80
31-097-26017-00-00	8390	0.87
31-097-26017-00-00	8400	0.40
31-097-26017-00-00	8410	0.44
31-097-26017-00-00	8420	0.47
31-097-26017-00-00	8430	0.55
31-097-26017-00-00	8440	0.69
31-097-26017-00-00	8450	0.62
31-097-26017-00-00	8460	0.47
31-097-26017-00-00	8470	0.40
31-097-26017-00-00	8480	0.23
31-097-26017-00-00	8490	0.33
31-097-26017-00-00	8500	0.28
31-097-26017-00-00	8510	0.29
31-097-26017-00-00	8520	0.28
31-097-26017-00-00	8530	0.32
31-097-26017-00-00	8540	0.23
31-097-26017-00-00	8550	0.35
31-097-26017-00-00	8560	0.35
31-097-26017-00-00	8570	0.52
31-097-26017-00-00	8580	0.48
31-097-26017-00-00	8590	0.42
31-097-26017-00-00	8600	0.44
31-097-26017-00-00	8610	0.47
31-097-26017-00-00	8620	0.50
31-097-26017-00-00	8630	0.50
31-097-26017-00-00	8640	0.46
31-097-26017-00-00	8650	0.67
31-097-26017-00-00	8660	0.67
31-097-26017-00-00	8670	0.52
31-097-26017-00-00	8680	0.47
31-097-26017-00-00	8690	0.81
31-097-26017-00-00	8700	0.75
31-097-26017-00-00	8710	0.92
31-097-26017-00-00	8720	0.89
31-097-26017-00-00	8730	1.30
31-097-26017-00-00	8740	1.33
31-097-26017-00-00	8750	1.17
31-097-26017-00-00	8760	1.26
31-097-26017-00-00	8770	1.36
31-097-26017-00-00	8780	1.86
31-097-26017-00-00	8790	1.75
31-097-26017-00-00	8800	1.60
31-097-26017-00-00	8810	1.47
31-097-26017-00-00	8820	1.05
31-097-26017-00-00	8830	0.97
31-097-26017-00-00	8840	1.25
31-097-26017-00-00	8850	1.05
31-097-26017-00-00	8860	1.12
31-097-26017-00-00	8870	0.63
31-097-26017-00-00	8880	0.63
31-097-26017-00-00	8890	0.66
31-097-26017-00-00	8900	0.67
Duplicates		
31-097-26017-00-00	8270-2	0.83
31-097-26017-00-00	8470-2	0.43
31-097-26017-00-00	8580-2	0.50
31-097-26017-00-00	8660-2	0.68



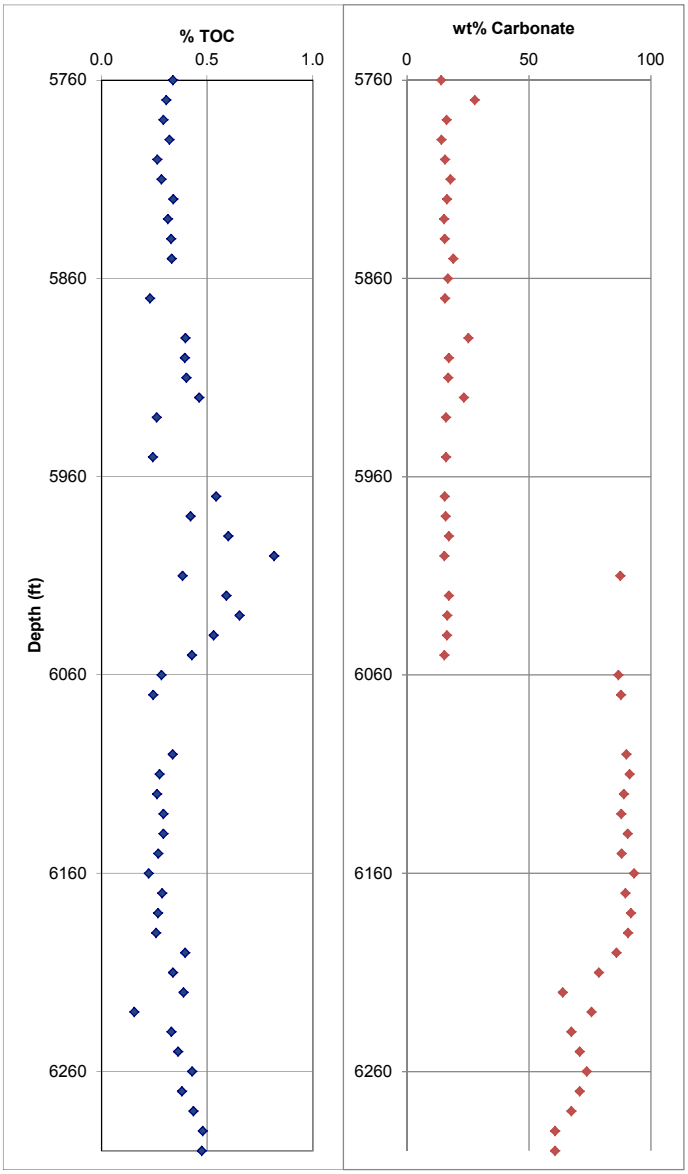
31-099-04203-00-00			
API	**Depth (ft)**	**% TOC**	**wt% Carbonate**
31-099-04203-00-00	3450	0.39	11.48
31-099-04203-00-00	3470	0.24	12.89
31-099-04203-00-00	3490	0.38	14.30
31-099-04203-00-00	3510	0.35	13.90
31-099-04203-00-00	3530	0.44	14.57
31-099-04203-00-00	3550	0.41	47.93
31-099-04203-00-00	3570	0.14	83.17
31-099-04203-00-00	3590	0.22	74.69
31-099-04203-00-00	3610	0.18	83.66
31-099-04203-00-00	3630	0.16	88.54
31-099-04203-00-00	3650	0.15	90.10
31-099-04203-00-00	3670	0.16	88.24
31-099-04203-00-00	3690	0.22	83.89
31-099-04203-00-00	3710	0.29	64.91
31-099-04203-00-00	3730	0.29	68.91
31-099-04203-00-00	3750	0.31	66.57
31-099-04203-00-00	3770	0.34	75.94
31-099-04203-00-00	3790	0.31	73.70
31-099-04203-00-00	3810	0.43	66.55
31-099-04203-00-00	3830	0.41	76.00
31-099-04203-00-00	3850	0.36	76.21
31-099-04203-00-00	3870	0.22	74.96
31-099-04203-00-00	3890	0.19	75.61
31-099-04203-00-00	3910	0.25	72.13
Duplicates			
31-099-04203-00-00	3910-2	0.24	



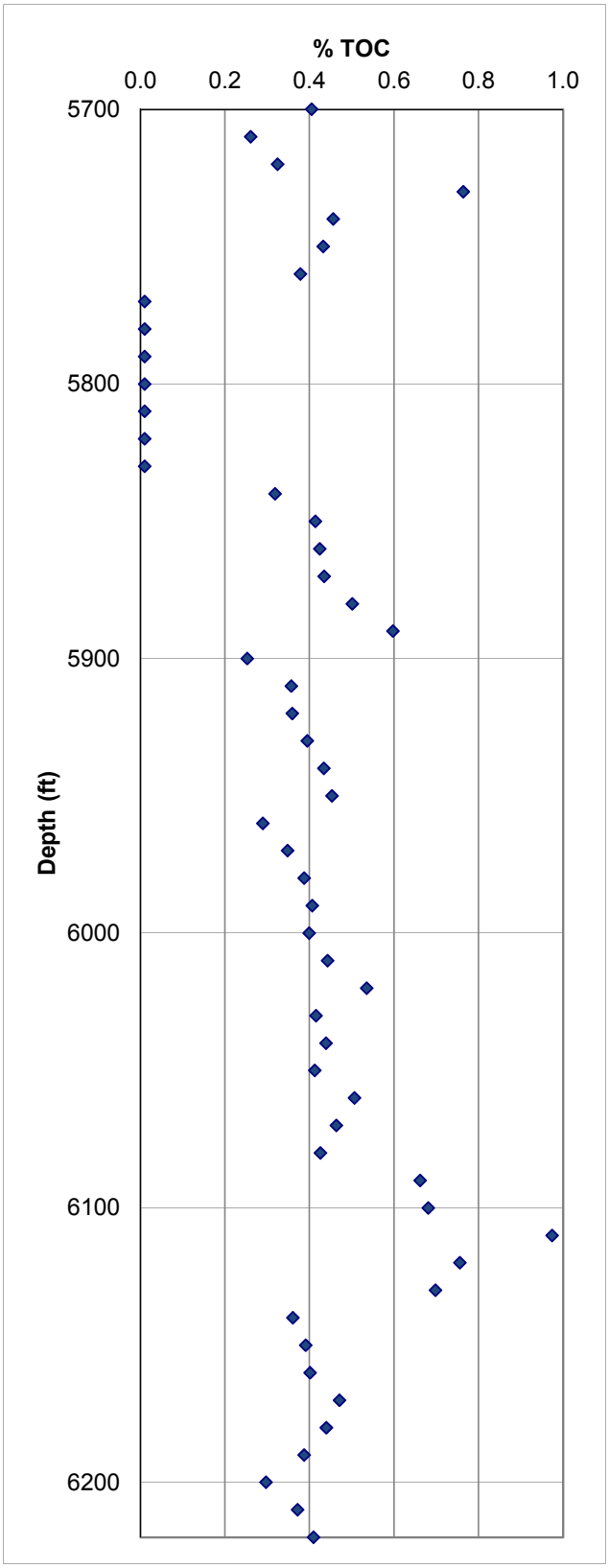
31-101-03924-00-00			
API	Depth (ft)	%TOC	wt% Carbonate
31-101-03924-00-00	9430		15.48
31-101-03924-00-00	9440		15.34
31-101-03924-00-00	9450		13.40
31-101-03924-00-00	9460		6.47
31-101-03924-00-00	9470		14.79
31-101-03924-00-00	9480		14.17
31-101-03924-00-00	9490		28.79
31-101-03924-00-00	9500		16.55
31-101-03924-00-00	9510	0.91	14.43
31-101-03924-00-00	9520	0.70	20.50
31-101-03924-00-00	9530	0.61	25.18
31-101-03924-00-00	9540	0.63	9.46
31-101-03924-00-00	9550	0.62	16.57
31-101-03924-00-00	9560	0.43	15.62
31-101-03924-00-00	9570	0.53	15.60
31-101-03924-00-00	9580	0.79	15.47
31-101-03924-00-00	9590	0.80	19.00
31-101-03924-00-00	9600	0.94	19.17
31-101-03924-00-00	9610	0.97	19.76
31-101-03924-00-00	9620	0.95	20.06
31-101-03924-00-00	9630	2.04	18.33
31-101-03924-00-00	9640	7.27	20.92
31-101-03924-00-00	9650	2.47	19.17
31-101-03924-00-00	9660	2.30	20.80
31-101-03924-00-00	9670	2.07	21.81
31-101-03924-00-00	9680	2.25	40.03
31-101-03924-00-00	9690	1.23	61.78
31-101-03924-00-00	9700	1.02	70.85
31-101-03924-00-00	9710	0.89	70.37
31-101-03924-00-00	9720	0.89	68.10
31-101-03924-00-00	9730	0.96	68.10
31-101-03924-00-00	9740	0.77	71.86
31-101-03924-00-00	9750	0.90	70.04
31-101-03924-00-00	9760	1.18	68.97
31-101-03924-00-00	9770	1.38	78.34
31-101-03924-00-00	9780	1.43	74.64
31-101-03924-00-00	9790	2.02	71.17
31-101-03924-00-00	9800	1.59	79.92
31-101-03924-00-00	9810	1.69	70.76
31-101-03924-00-00	9820	1.92	76.45
31-101-03924-00-00	9830	1.42	79.05
31-101-03924-00-00	9840	3.33	73.32
31-101-03924-00-00	9850	2.88	79.50
31-101-03924-00-00	9860	1.78	83.94
31-101-03924-00-00	9870	2.48	81.00
31-101-03924-00-00	9880	1.71	77.01
31-101-03924-00-00	9890	2.09	81.54
31-101-03924-00-00	9900	0.74	79.08
31-101-03924-00-00	9910	0.29	84.55
31-101-03924-00-00	9920	0.13	86.20
31-101-03924-00-00	9930	0.19	86.66
31-101-03924-00-00	9940	0.15	82.68
31-101-03924-00-00	9950	0.17	85.07
31-101-03924-00-00	9960	0.10	82.30
31-101-03924-00-00	9970	0.16	78.08
31-101-03924-00-00	9980	0.17	69.38
31-101-03924-00-00	9990	0.12	77.56
31-101-03924-00-00	10000	0.15	71.87
31-101-03924-00-00	10010	0.12	76.11
31-101-03924-00-00	10020	0.06	73.13
31-101-03924-00-00	10030	0.08	76.59
31-101-03924-00-00	10040	0.09	74.74
31-101-03924-00-00	10050	0.34	
31-101-03924-00-00	10060	0.22	80.05
31-101-03924-00-00	10070	0.13	77.47
31-101-03924-00-00	10080	0.05	81.22
31-101-03924-00-00	10090	0.08	77.33
31-101-03924-00-00	10110	0.12	70.12
31-101-03924-00-00	10120	0.13	73.25
31-101-03924-00-00	10130	0.23	76.07
31-101-03924-00-00	10140	0.19	76.44
31-101-03924-00-00	10150	0.49	74.25
31-101-03924-00-00	10160	0.44	66.18
31-101-03924-00-00	10170	0.23	78.92
31-101-03924-00-00	10180	0.32	70.57
31-101-03924-00-00	10190	0.36	64.10
31-101-03924-00-00	10200	0.13	77.43
31-101-03924-00-00	10210	0.77	78.55
31-101-03924-00-00	10220	0.34	85.91
31-101-03924-00-00	10230	0.25	87.25
31-101-03924-00-00	10240	0.12	88.39
31-101-03924-00-00	10250	0.11	
Duplicates			
31-101-03924-00-00	9510-2	0.91	
31-101-03924-00-00	9590-2	0.87	
31-101-03924-00-00	9750-2	0.89	
31-101-03924-00-00	9900-2	0.73	
31-101-03924-00-00	9970-2	0.13	
31-101-03924-00-00	10250-2	0.12	



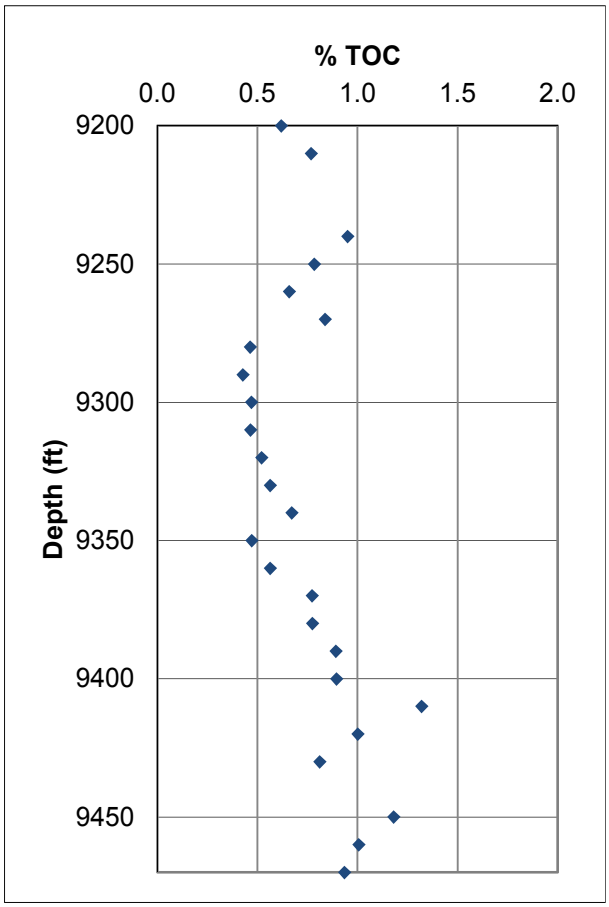
31-101-21692-00-00			
API	Depth (ft)	% TOC	wt% Carbonate
31-101-21692-00-00	5760	0.34	13.97
31-101-21692-00-00	5770	0.31	27.77
31-101-21692-00-00	5780	0.29	16.18
31-101-21692-00-00	5790	0.32	14.04
31-101-21692-00-00	5800	0.26	15.59
31-101-21692-00-00	5810	0.28	17.74
31-101-21692-00-00	5820	0.34	16.27
31-101-21692-00-00	5830	0.31	15.08
31-101-21692-00-00	5840	0.33	15.44
31-101-21692-00-00	5850	0.33	18.99
31-101-21692-00-00	5860		16.68
31-101-21692-00-00	5870	0.23	15.51
31-101-21692-00-00	5880		
31-101-21692-00-00	5890	0.40	25.06
31-101-21692-00-00	5900	0.39	17.14
31-101-21692-00-00	5910	0.40	16.87
31-101-21692-00-00	5920	0.46	23.28
31-101-21692-00-00	5930	0.26	15.94
31-101-21692-00-00	5940		
31-101-21692-00-00	5950	0.24	15.91
31-101-21692-00-00	5960		
31-101-21692-00-00	5970	0.54	15.40
31-101-21692-00-00	5980	0.42	15.76
31-101-21692-00-00	5990	0.60	17.14
31-101-21692-00-00	6000	0.82	15.28
31-101-21692-00-00	6010	0.38	87.42
31-101-21692-00-00	6020	0.59	17.12
31-101-21692-00-00	6030	0.65	16.49
31-101-21692-00-00	6040	0.53	16.33
31-101-21692-00-00	6050	0.43	15.21
31-101-21692-00-00	6060	0.28	86.69
31-101-21692-00-00	6070	0.24	87.77
31-101-21692-00-00	6080		
31-101-21692-00-00	6090		
31-101-21692-00-00	6100	0.34	89.99
31-101-21692-00-00	6110	0.28	91.22
31-101-21692-00-00	6120	0.26	88.89
31-101-21692-00-00	6130	0.29	87.85
31-101-21692-00-00	6140	0.29	90.51
31-101-21692-00-00	6150	0.27	88.00
31-101-21692-00-00	6160	0.22	93.14
31-101-21692-00-00	6170	0.29	89.61
31-101-21692-00-00	6180	0.27	91.82
31-101-21692-00-00	6190	0.26	90.62
31-101-21692-00-00	6200	0.40	85.85
31-101-21692-00-00	6210	0.34	78.72
31-101-21692-00-00	6220	0.39	63.90
31-101-21692-00-00	6230	0.15	75.62
31-101-21692-00-00	6240	0.33	67.39
31-101-21692-00-00	6250	0.36	70.74
31-101-21692-00-00	6260	0.43	73.68
31-101-21692-00-00	6270	0.38	70.83
31-101-21692-00-00	6280	0.44	67.42
31-101-21692-00-00	6290	0.48	60.75
31-101-21692-00-00	6300	0.47	60.71
Duplicates			
31-101-21692-00-00	5870-2	0.44	
31-101-21692-00-00	6160-2	0.23	



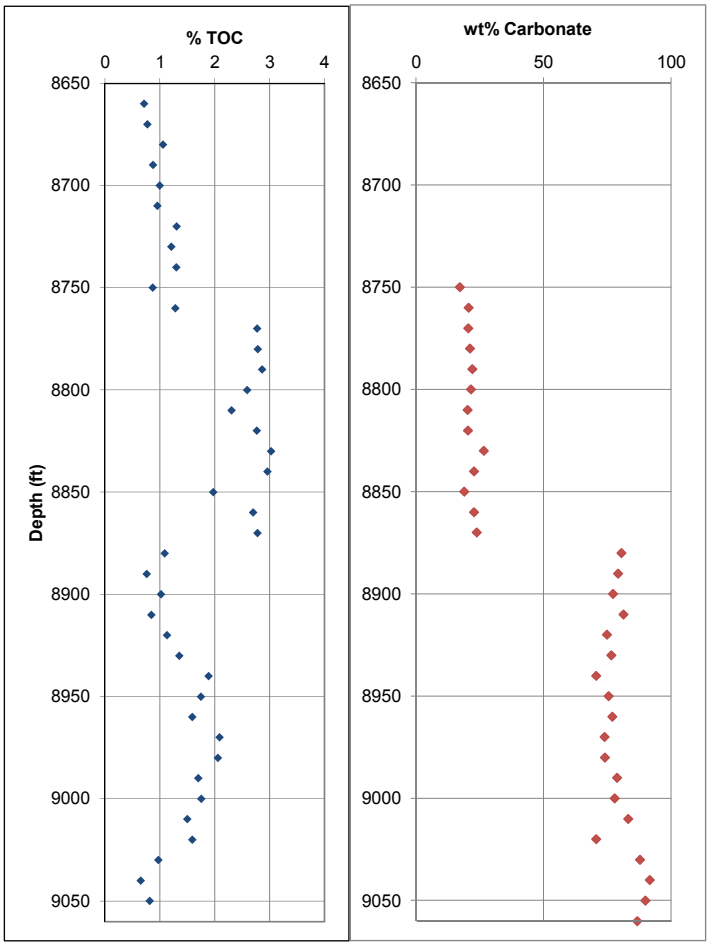
31-101-21703-00-00		
API	Depth (ft)	% TOC
31-101-21703-00-00	5700	0.41
31-101-21703-00-00	5710	0.26
31-101-21703-00-00	5720	0.32
31-101-21703-00-00	5730	0.76
31-101-21703-00-00	5740	0.46
31-101-21703-00-00	5750	0.43
31-101-21703-00-00	5760	0.38
31-101-21703-00-00	5770	0.01
31-101-21703-00-00	5780	0.01
31-101-21703-00-00	5790	0.01
31-101-21703-00-00	5800	0.01
31-101-21703-00-00	5810	0.01
31-101-21703-00-00	5820	0.01
31-101-21703-00-00	5830	0.01
31-101-21703-00-00	5840	0.32
31-101-21703-00-00	5850	0.41
31-101-21703-00-00	5860	0.42
31-101-21703-00-00	5870	0.43
31-101-21703-00-00	5880	0.50
31-101-21703-00-00	5890	0.60
31-101-21703-00-00	5900	0.25
31-101-21703-00-00	5910	0.36
31-101-21703-00-00	5920	0.36
31-101-21703-00-00	5930	0.39
31-101-21703-00-00	5940	0.43
31-101-21703-00-00	5950	0.45
31-101-21703-00-00	5960	0.29
31-101-21703-00-00	5970	0.35
31-101-21703-00-00	5980	0.39
31-101-21703-00-00	5990	0.41
31-101-21703-00-00	6000	0.40
31-101-21703-00-00	6010	0.44
31-101-21703-00-00	6020	0.54
31-101-21703-00-00	6030	0.42
31-101-21703-00-00	6040	0.44
31-101-21703-00-00	6050	0.41
31-101-21703-00-00	6060	0.51
31-101-21703-00-00	6070	0.46
31-101-21703-00-00	6080	0.43
31-101-21703-00-00	6090	0.66
31-101-21703-00-00	6100	0.68
31-101-21703-00-00	6110	0.97
31-101-21703-00-00	6120	0.76
31-101-21703-00-00	6130	0.70
31-101-21703-00-00	6140	0.36
31-101-21703-00-00	6150	0.39
31-101-21703-00-00	6160	0.40
31-101-21703-00-00	6170	0.47
31-101-21703-00-00	6180	0.44
31-101-21703-00-00	6190	0.39
31-101-21703-00-00	6200	0.30
31-101-21703-00-00	6210	0.37
31-101-21703-00-00	6220	0.41
Duplicates		
31-101-21703-00-00	5930-2	0.41



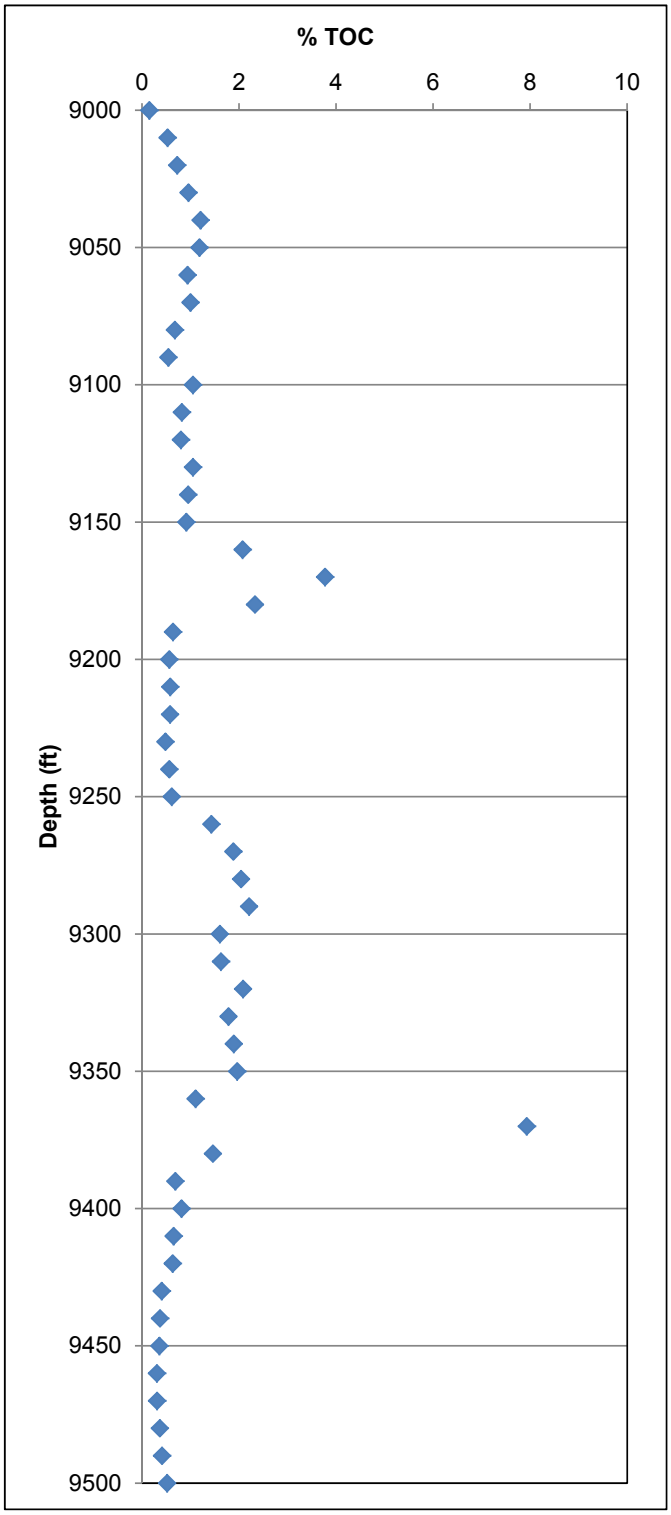
31-101-22852-00-00		
API	Depth (ft)	% TOC
31-101-22852-00-00	9200	0.62
31-101-22852-00-00	9210	0.77
31-101-22852-00-00	9240	0.95
31-101-22852-00-00	9250	0.78
31-101-22852-00-00	9260	0.66
31-101-22852-00-00	9270	0.84
31-101-22852-00-00	9280	0.46
31-101-22852-00-00	9290	0.43
31-101-22852-00-00	9300	0.47
31-101-22852-00-00	9310	0.47
31-101-22852-00-00	9320	0.52
31-101-22852-00-00	9330	0.56
31-101-22852-00-00	9340	0.67
31-101-22852-00-00	9350	0.47
31-101-22852-00-00	9360	0.56
31-101-22852-00-00	9370	0.77
31-101-22852-00-00	9380	0.78
31-101-22852-00-00	9390	0.89
31-101-22852-00-00	9400	0.89
31-101-22852-00-00	9410	1.32
31-101-22852-00-00	9420	1.00
31-101-22852-00-00	9430	0.81
31-101-22852-00-00	9450	1.18
31-101-22852-00-00	9460	1.01
31-101-22852-00-00	9470	0.93
Duplicates		
31-101-22852-00-00	9290-2	0.48



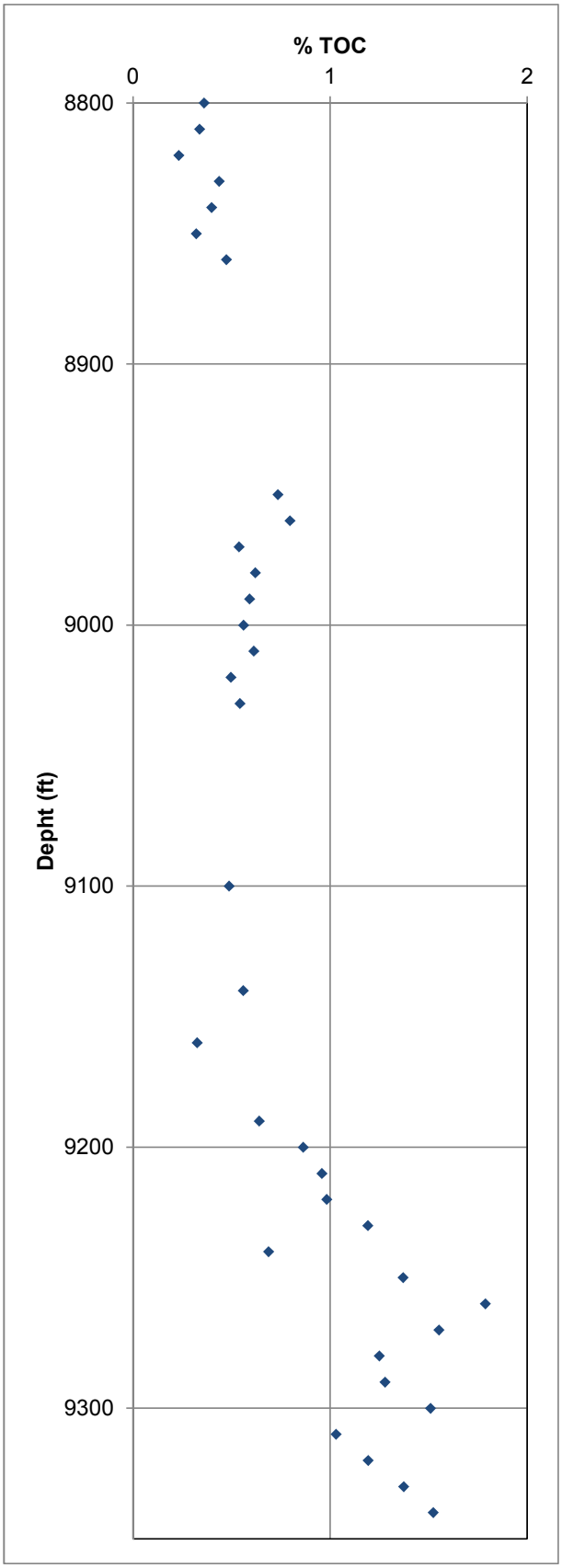
31-101-22979-00-00			
API	Depth (ft)	% TOC	wt% Carbonate
31-101-22979-00-00	8660	0.71	
31-101-22979-00-00	8670	0.77	
31-101-22979-00-00	8680	1.06	
31-101-22979-00-00	8690	0.87	
31-101-22979-00-00	8700	0.99	
31-101-22979-00-00	8710	0.95	
31-101-22979-00-00	8720	1.30	
31-101-22979-00-00	8730	1.21	
31-101-22979-00-00	8740	1.30	
31-101-22979-00-00	8750	0.87	17.12
31-101-22979-00-00	8760	1.27	20.52
31-101-22979-00-00	8770	2.77	20.45
31-101-22979-00-00	8780	2.78	21.14
31-101-22979-00-00	8790	2.86	22.03
31-101-22979-00-00	8800	2.59	21.48
31-101-22979-00-00	8810	2.30	20.20
31-101-22979-00-00	8820	2.76	20.31
31-101-22979-00-00	8830	3.02	26.50
31-101-22979-00-00	8840	2.95	22.65
31-101-22979-00-00	8850	1.97	18.87
31-101-22979-00-00	8860	2.69	22.65
31-101-22979-00-00	8870	2.77	23.71
31-101-22979-00-00	8880	1.08	80.52
31-101-22979-00-00	8890	0.76	79.10
31-101-22979-00-00	8900	1.02	77.22
31-101-22979-00-00	8910	0.84	81.30
31-101-22979-00-00	8920	1.13	74.82
31-101-22979-00-00	8930	1.35	76.54
31-101-22979-00-00	8940	1.88	70.63
31-101-22979-00-00	8950	1.74	75.48
31-101-22979-00-00	8960	1.58	76.92
31-101-22979-00-00	8970	2.08	73.80
31-101-22979-00-00	8980	2.06	74.01
31-101-22979-00-00	8990	1.70	78.79
31-101-22979-00-00	9000	1.75	77.80
31-101-22979-00-00	9010	1.50	83.09
31-101-22979-00-00	9020	1.59	70.54
31-101-22979-00-00	9030	0.97	87.80
31-101-22979-00-00	9040	0.65	91.53
31-101-22979-00-00	9050	0.81	89.82
31-101-22979-00-00	9060		86.70
Duplicates			
31-101-22979-00-00	8800-2	2.65	
31-101-22979-00-00	8880-2	1.04	
31-101-22979-00-00	8960-2	1.54	



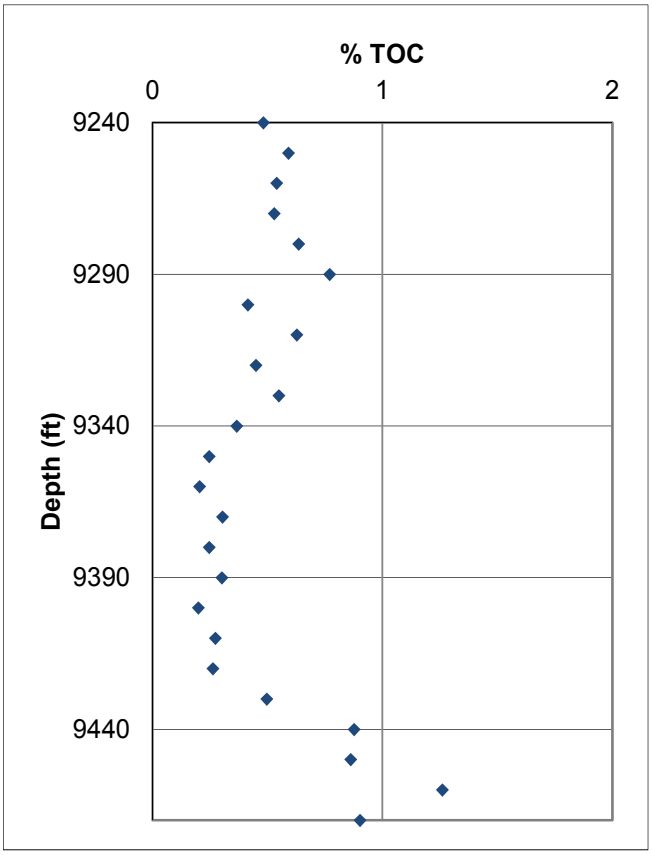
31-101-23055-00-00		
API	Depth (ft)	% TOC
31-101-23055-00-00	9000	0.15
31-101-23055-00-00	9010	0.53
31-101-23055-00-00	9020	0.73
31-101-23055-00-00	9030	0.96
31-101-23055-00-00	9040	1.21
31-101-23055-00-00	9050	1.18
31-101-23055-00-00	9060	0.94
31-101-23055-00-00	9070	1.00
31-101-23055-00-00	9080	0.68
31-101-23055-00-00	9090	0.54
31-101-23055-00-00	9100	1.05
31-101-23055-00-00	9110	0.82
31-101-23055-00-00	9120	0.80
31-101-23055-00-00	9130	1.05
31-101-23055-00-00	9140	0.95
31-101-23055-00-00	9150	0.91
31-101-23055-00-00	9160	2.07
31-101-23055-00-00	9170	3.77
31-101-23055-00-00	9180	2.33
31-101-23055-00-00	9190	0.64
31-101-23055-00-00	9200	0.56
31-101-23055-00-00	9210	0.58
31-101-23055-00-00	9220	0.58
31-101-23055-00-00	9230	0.48
31-101-23055-00-00	9240	0.56
31-101-23055-00-00	9250	0.61
31-101-23055-00-00	9260	1.43
31-101-23055-00-00	9270	1.88
31-101-23055-00-00	9280	2.04
31-101-23055-00-00	9290	2.21
31-101-23055-00-00	9300	1.61
31-101-23055-00-00	9310	1.63
31-101-23055-00-00	9320	2.08
31-101-23055-00-00	9330	1.78
31-101-23055-00-00	9340	1.89
31-101-23055-00-00	9350	1.96
31-101-23055-00-00	9360	1.11
31-101-23055-00-00	9370	7.93
31-101-23055-00-00	9380	1.46
31-101-23055-00-00	9390	0.69
31-101-23055-00-00	9400	0.81
31-101-23055-00-00	9410	0.65
31-101-23055-00-00	9420	0.63
31-101-23055-00-00	9430	0.40
31-101-23055-00-00	9440	0.37
31-101-23055-00-00	9450	0.36
31-101-23055-00-00	9460	0.31
31-101-23055-00-00	9470	0.31
31-101-23055-00-00	9480	0.37
31-101-23055-00-00	9490	0.41
31-101-23055-00-00	9500	0.52
Duplicates		
31-101-23055-00-00	9330-2	1.84



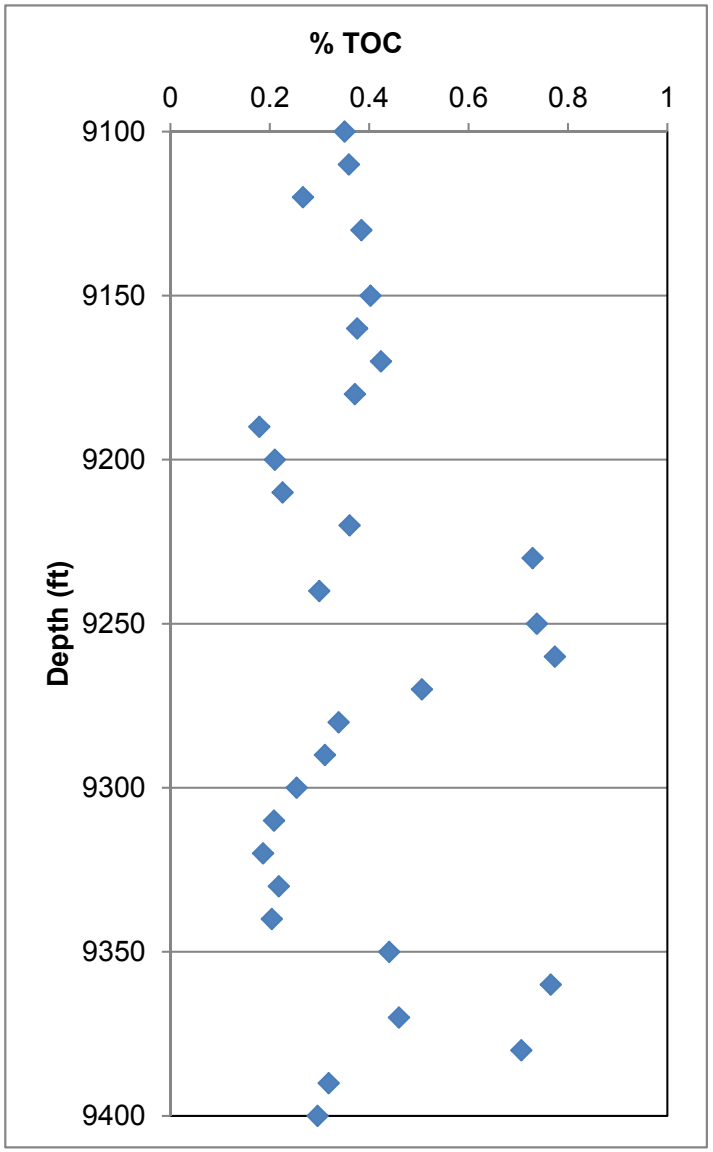
31-101-23085-00-00		
API	Depth (ft)	%TOC
31-101-23085-00-00	8800	0.36
31-101-23085-00-00	8810	0.34
31-101-23085-00-00	8820	0.23
31-101-23085-00-00	8830	0.44
31-101-23085-00-00	8840	0.40
31-101-23085-00-00	8850	0.32
31-101-23085-00-00	8860	0.47
31-101-23085-00-00	8870	
31-101-23085-00-00	8880	
31-101-23085-00-00	8890	
31-101-23085-00-00	8900	
31-101-23085-00-00	8910	
31-101-23085-00-00	8920	
31-101-23085-00-00	8930	
31-101-23085-00-00	8940	
31-101-23085-00-00	8950	0.73
31-101-23085-00-00	8960	0.79
31-101-23085-00-00	8970	0.54
31-101-23085-00-00	8980	0.62
31-101-23085-00-00	8990	0.59
31-101-23085-00-00	9000	0.56
31-101-23085-00-00	9010	0.61
31-101-23085-00-00	9020	0.50
31-101-23085-00-00	9030	0.54
31-101-23085-00-00	9040	
31-101-23085-00-00	9050	
31-101-23085-00-00	9060	
31-101-23085-00-00	9070	
31-101-23085-00-00	9080	
31-101-23085-00-00	9090	
31-101-23085-00-00	9100	0.49
31-101-23085-00-00	9110	
31-101-23085-00-00	9120	
31-101-23085-00-00	9130	
31-101-23085-00-00	9140	0.56
31-101-23085-00-00	9150	
31-101-23085-00-00	9160	0.32
31-101-23085-00-00	9170	
31-101-23085-00-00	9180	
31-101-23085-00-00	9190	0.64
31-101-23085-00-00	9200	0.86
31-101-23085-00-00	9210	0.96
31-101-23085-00-00	9220	0.98
31-101-23085-00-00	9230	1.19
31-101-23085-00-00	9240	0.69
31-101-23085-00-00	9250	1.37
31-101-23085-00-00	9260	1.79
31-101-23085-00-00	9270	1.55
31-101-23085-00-00	9280	1.25
31-101-23085-00-00	9290	1.28
31-101-23085-00-00	9300	1.51
31-101-23085-00-00	9310	1.03
31-101-23085-00-00	9320	1.19
31-101-23085-00-00	9330	1.37
31-101-23085-00-00	9340	1.52



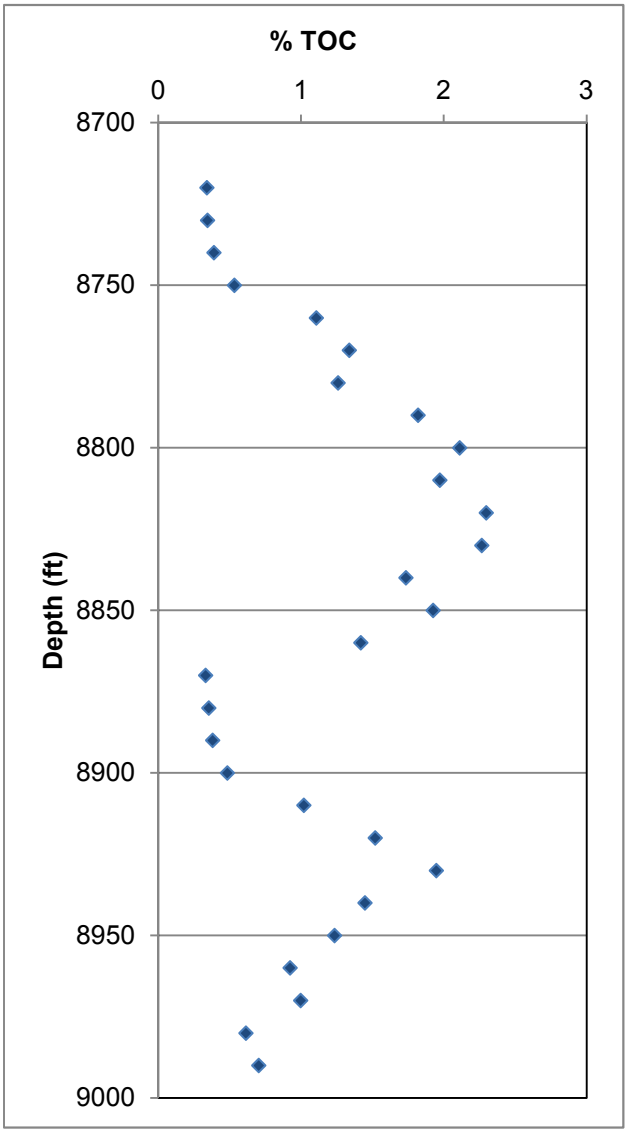
31-101-23155-00-00		
API	Depth (ft)	% TOC
31-101-23155-00-00	9240	0.48
31-101-23155-00-00	9250	0.59
31-101-23155-00-00	9260	0.54
31-101-23155-00-00	9270	0.53
31-101-23155-00-00	9280	0.64
31-101-23155-00-00	9290	0.77
31-101-23155-00-00	9300	0.42
31-101-23155-00-00	9310	0.63
31-101-23155-00-00	9320	0.45
31-101-23155-00-00	9330	0.55
31-101-23155-00-00	9340	0.37
31-101-23155-00-00	9350	0.25
31-101-23155-00-00	9360	0.21
31-101-23155-00-00	9370	0.31
31-101-23155-00-00	9380	0.25
31-101-23155-00-00	9390	0.30
31-101-23155-00-00	9400	0.20
31-101-23155-00-00	9410	0.27
31-101-23155-00-00	9420	0.26
31-101-23155-00-00	9430	0.50
31-101-23155-00-00	9440	0.88
31-101-23155-00-00	9450	0.86
31-101-23155-00-00	9460	1.26
31-101-23155-00-00	9470	0.90
Duplicates		
31-101-23155-00-00	9310-2	0.58



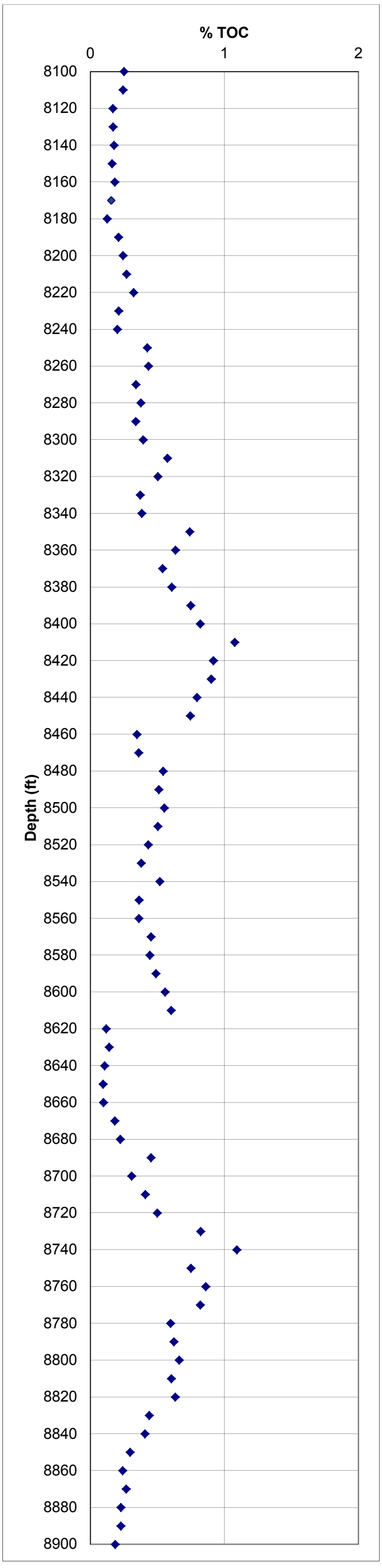
31-101-23190-00-00		
API	Depth (ft)	% TOC
31-101-23190-00-00	9100	0.35
31-101-23190-00-00	9110	0.36
31-101-23190-00-00	9120	0.27
31-101-23190-00-00	9130	0.38
31-101-23190-00-00	9140	
31-101-23190-00-00	9150	0.40
31-101-23190-00-00	9160	0.38
31-101-23190-00-00	9170	0.42
31-101-23190-00-00	9180	0.37
31-101-23190-00-00	9190	0.18
31-101-23190-00-00	9200	0.21
31-101-23190-00-00	9210	0.23
31-101-23190-00-00	9220	0.36
31-101-23190-00-00	9230	0.73
31-101-23190-00-00	9240	0.30
31-101-23190-00-00	9250	0.74
31-101-23190-00-00	9260	0.77
31-101-23190-00-00	9270	0.51
31-101-23190-00-00	9280	0.34
31-101-23190-00-00	9290	0.31
31-101-23190-00-00	9300	0.25
31-101-23190-00-00	9310	0.21
31-101-23190-00-00	9320	0.19
31-101-23190-00-00	9330	0.22
31-101-23190-00-00	9340	0.20
31-101-23190-00-00	9350	0.44
31-101-23190-00-00	9360	0.77
31-101-23190-00-00	9370	0.46
31-101-23190-00-00	9380	0.71
31-101-23190-00-00	9390	0.32
31-101-23190-00-00	9400	0.30
Duplicates		
31-101-23190-00-00	9400-2	0.37



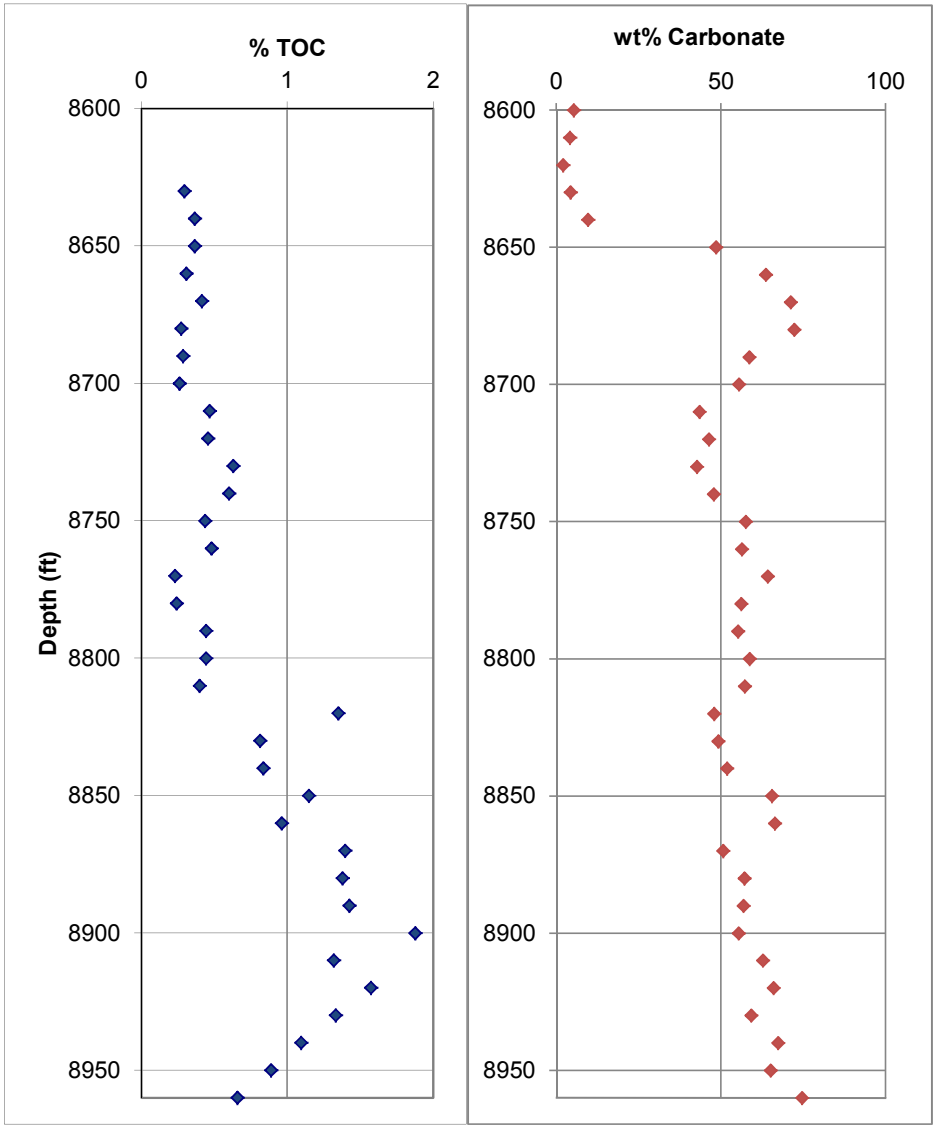
31-101-23958-00-00		
API	Depth (ft)	% TOC
31-101-23958-00-00	8720	0.34
31-101-23958-00-00	8730	0.35
31-101-23958-00-00	8740	0.39
31-101-23958-00-00	8750	0.53
31-101-23958-00-00	8760	1.11
31-101-23958-00-00	8770	1.34
31-101-23958-00-00	8780	1.26
31-101-23958-00-00	8790	1.82
31-101-23958-00-00	8800	2.11
31-101-23958-00-00	8810	1.97
31-101-23958-00-00	8820	2.30
31-101-23958-00-00	8830	2.27
31-101-23958-00-00	8840	1.74
31-101-23958-00-00	8850	1.93
31-101-23958-00-00	8860	1.42
31-101-23958-00-00	8870	0.33
31-101-23958-00-00	8880	0.35
31-101-23958-00-00	8890	0.38
31-101-23958-00-00	8900	0.48
31-101-23958-00-00	8910	1.02
31-101-23958-00-00	8920	1.52
31-101-23958-00-00	8930	1.95
31-101-23958-00-00	8940	1.45
31-101-23958-00-00	8950	1.24
31-101-23958-00-00	8960	0.92
31-101-23958-00-00	8970	1.00
31-101-23958-00-00	8980	0.62
31-101-23958-00-00	8990	0.70
Duplicates		
31-101-23958-00-00	8790-2	2.07
31-101-23958-00-00	8990-2	0.73



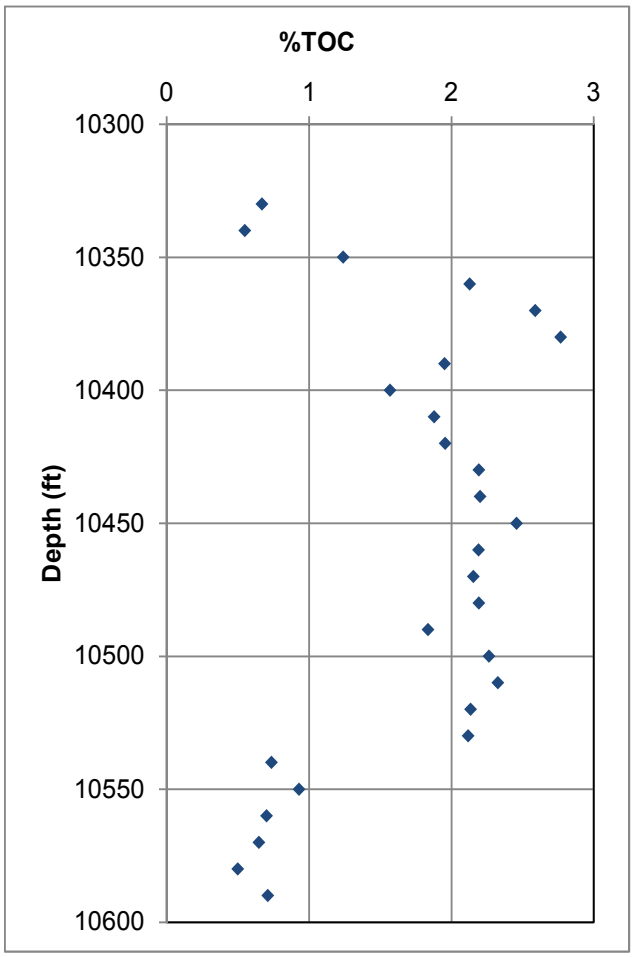
31-101-23985-00-00		
API	Depth (ft)	% TOC
31-101-23985-00-00	8100	0.25
31-101-23985-00-00	8110	0.24
31-101-23985-00-00	8120	0.17
31-101-23985-00-00	8130	0.17
31-101-23985-00-00	8140	0.18
31-101-23985-00-00	8150	0.16
31-101-23985-00-00	8160	0.18
31-101-23985-00-00	8170	0.16
31-101-23985-00-00	8180	0.13
31-101-23985-00-00	8190	0.21
31-101-23985-00-00	8200	0.24
31-101-23985-00-00	8210	0.27
31-101-23985-00-00	8220	0.32
31-101-23985-00-00	8230	0.21
31-101-23985-00-00	8240	0.20
31-101-23985-00-00	8250	0.43
31-101-23985-00-00	8260	0.43
31-101-23985-00-00	8270	0.34
31-101-23985-00-00	8280	0.38
31-101-23985-00-00	8290	0.34
31-101-23985-00-00	8300	0.39
31-101-23985-00-00	8310	0.57
31-101-23985-00-00	8320	0.50
31-101-23985-00-00	8330	0.37
31-101-23985-00-00	8340	0.38
31-101-23985-00-00	8350	0.74
31-101-23985-00-00	8360	0.63
31-101-23985-00-00	8370	0.54
31-101-23985-00-00	8380	0.61
31-101-23985-00-00	8390	0.75
31-101-23985-00-00	8400	0.82
31-101-23985-00-00	8410	1.08
31-101-23985-00-00	8420	0.92
31-101-23985-00-00	8430	0.90
31-101-23985-00-00	8440	0.80
31-101-23985-00-00	8450	0.75
31-101-23985-00-00	8460	0.35
31-101-23985-00-00	8470	0.36
31-101-23985-00-00	8480	0.54
31-101-23985-00-00	8490	0.51
31-101-23985-00-00	8500	0.55
31-101-23985-00-00	8510	0.50
31-101-23985-00-00	8520	0.43
31-101-23985-00-00	8530	0.38
31-101-23985-00-00	8540	0.52
31-101-23985-00-00	8550	0.36
31-101-23985-00-00	8560	0.36
31-101-23985-00-00	8570	0.45
31-101-23985-00-00	8580	0.44
31-101-23985-00-00	8590	0.49
31-101-23985-00-00	8600	0.56
31-101-23985-00-00	8610	0.60
31-101-23985-00-00	8620	0.12
31-101-23985-00-00	8630	0.14
31-101-23985-00-00	8640	0.11
31-101-23985-00-00	8650	0.09
31-101-23985-00-00	8660	0.10
31-101-23985-00-00	8670	0.18
31-101-23985-00-00	8680	0.22
31-101-23985-00-00	8690	0.45
31-101-23985-00-00	8700	0.31
31-101-23985-00-00	8710	0.41
31-101-23985-00-00	8720	0.50
31-101-23985-00-00	8730	0.82
31-101-23985-00-00	8740	1.09
31-101-23985-00-00	8750	0.75
31-101-23985-00-00	8760	0.86
31-101-23985-00-00	8770	0.82
31-101-23985-00-00	8780	0.60
31-101-23985-00-00	8790	0.62
31-101-23985-00-00	8800	0.66
31-101-23985-00-00	8810	0.60
31-101-23985-00-00	8820	0.63
31-101-23985-00-00	8830	0.44
31-101-23985-00-00	8840	0.41
31-101-23985-00-00	8850	0.30
31-101-23985-00-00	8860	0.24
31-101-23985-00-00	8870	0.27
31-101-23985-00-00	8880	0.23
31-101-23985-00-00	8890	0.23
31-101-23985-00-00	8900	0.19
Duplicates		
31-101-23985-00-00	8130-2	0.16
31-101-23985-00-00	8330-2	0.37
31-101-23985-00-00	8560-2	0.38
31-101-23985-00-00	8670-2	0.18
31-101-23985-00-00	8680-3	0.22
31-101-23985-00-00	8690-3	0.45
31-101-23985-00-00	8780-2	0.62



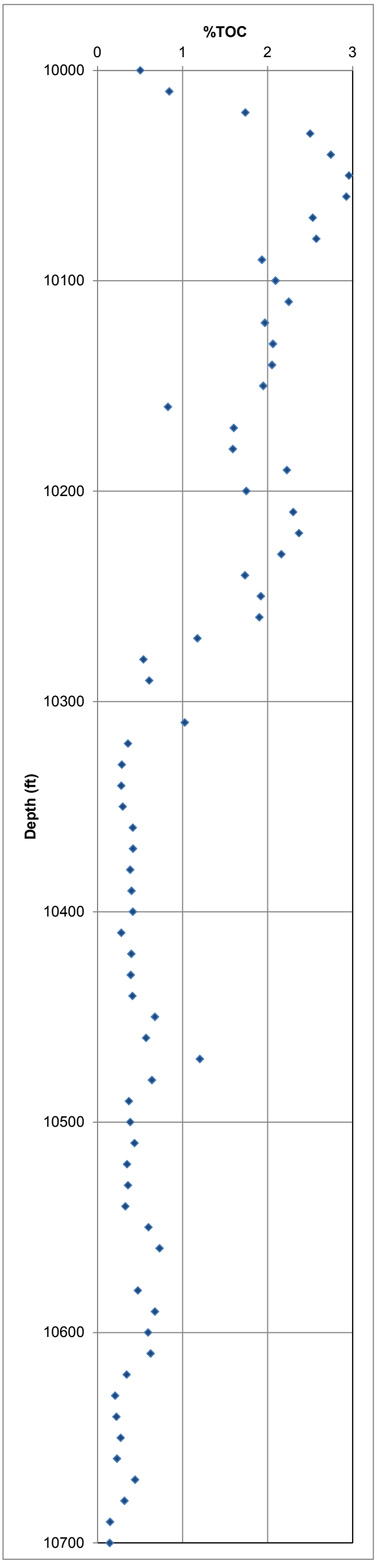
31-101-26011-00-00			
API	Depth (ft)	% TOC	wt% Carbonate
31-101-26011-00-00	8600		5.27
31-101-26011-00-00	8610		4.03
31-101-26011-00-00	8620		2.02
31-101-26011-00-00	8630	0.30	4.24
31-101-26011-00-00	8640	0.37	9.56
31-101-26011-00-00	8650	0.36	48.47
31-101-26011-00-00	8660	0.31	63.58
31-101-26011-00-00	8670	0.41	71.17
31-101-26011-00-00	8680	0.27	72.20
31-101-26011-00-00	8690	0.29	58.59
31-101-26011-00-00	8700	0.26	55.45
31-101-26011-00-00	8710	0.47	43.47
31-101-26011-00-00	8720	0.46	46.25
31-101-26011-00-00	8730	0.63	42.65
31-101-26011-00-00	8740	0.60	47.72
31-101-26011-00-00	8750	0.44	57.51
31-101-26011-00-00	8760	0.48	56.28
31-101-26011-00-00	8770	0.23	64.19
31-101-26011-00-00	8780	0.24	56.09
31-101-26011-00-00	8790	0.44	55.12
31-101-26011-00-00	8800	0.44	58.71
31-101-26011-00-00	8810	0.40	57.18
31-101-26011-00-00	8820	1.35	47.86
31-101-26011-00-00	8830	0.81	49.18
31-101-26011-00-00	8840	0.84	51.79
31-101-26011-00-00	8850	1.15	65.45
31-101-26011-00-00	8860	0.96	66.31
31-101-26011-00-00	8870	1.40	50.64
31-101-26011-00-00	8880	1.38	57.14
31-101-26011-00-00	8890	1.42	56.84
31-101-26011-00-00	8900	1.88	55.31
31-101-26011-00-00	8910	1.32	62.65
31-101-26011-00-00	8920	1.57	65.94
31-101-26011-00-00	8930	1.33	59.17
31-101-26011-00-00	8940	1.10	67.29
31-101-26011-00-00	8950	0.89	65.07
31-101-26011-00-00	8960	0.66	74.58
Duplicates			
31-101-26011-00-00	8700-2	0.29	
31-101-26011-00-00	8940-2	1.08	



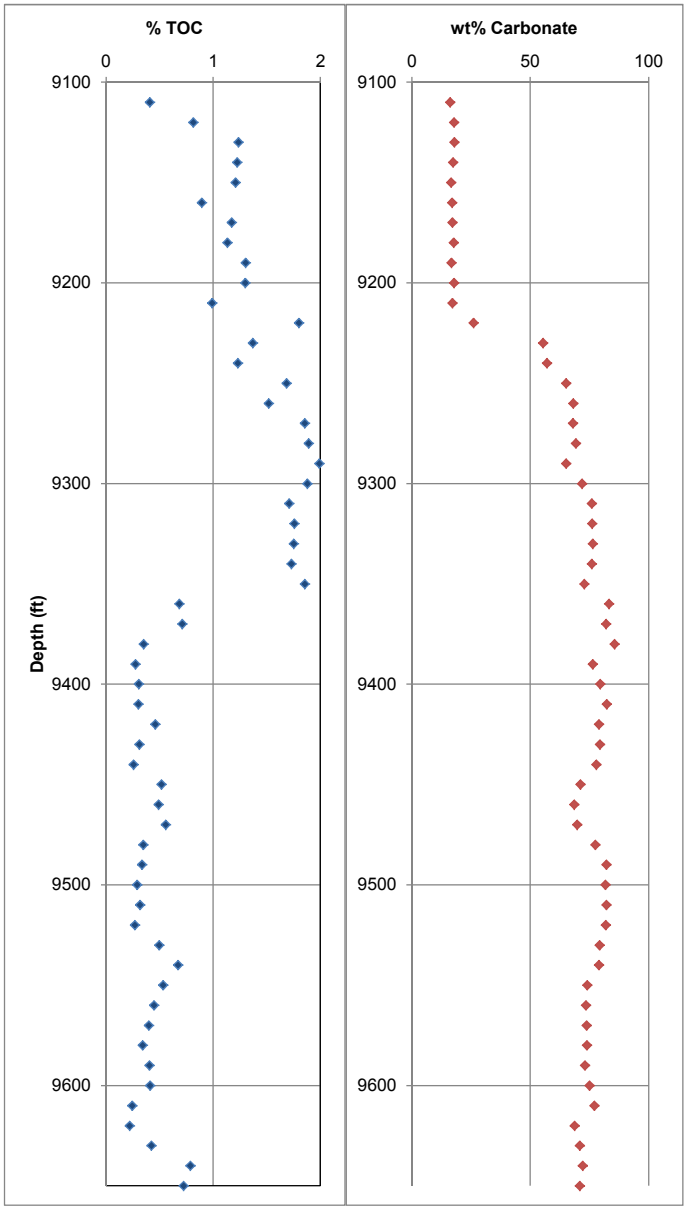
31-107-23192-00-00		
API	Depth (ft)	% TOC
31-107-23192-00-00	10330	0.67
31-107-231920-00-00	10340	0.55
31-107-231920-00-00	10350	1.24
31-107-231920-00-00	10360	2.13
31-107-231920-00-00	10370	2.59
31-107-231920-00-00	10380	2.77
31-107-231920-00-00	10390	1.95
31-107-231920-00-00	10400	1.57
31-107-231920-00-00	10410	1.88
31-107-231920-00-00	10420	1.96
31-107-231920-00-00	10430	2.19
31-107-231920-00-00	10440	2.20
31-107-231920-00-00	10450	2.46
31-107-231920-00-00	10460	2.19
31-107-231920-00-00	10470	2.16
31-107-231920-00-00	10480	2.19
31-107-231920-00-00	10490	1.84
31-107-231920-00-00	10500	2.26
31-107-231920-00-00	10510	2.33
31-107-231920-00-00	10520	2.13
31-107-231920-00-00	10530	2.12
31-107-231920-00-00	10540	0.74
31-107-231920-00-00	10550	0.93
31-107-231920-00-00	10560	0.70
31-107-231920-00-00	10570	0.65
31-107-231920-00-00	10580	0.50
31-107-231920-00-00	10590	0.71
Duplicates		
31-107-231920-00-00	10380-2	2.70



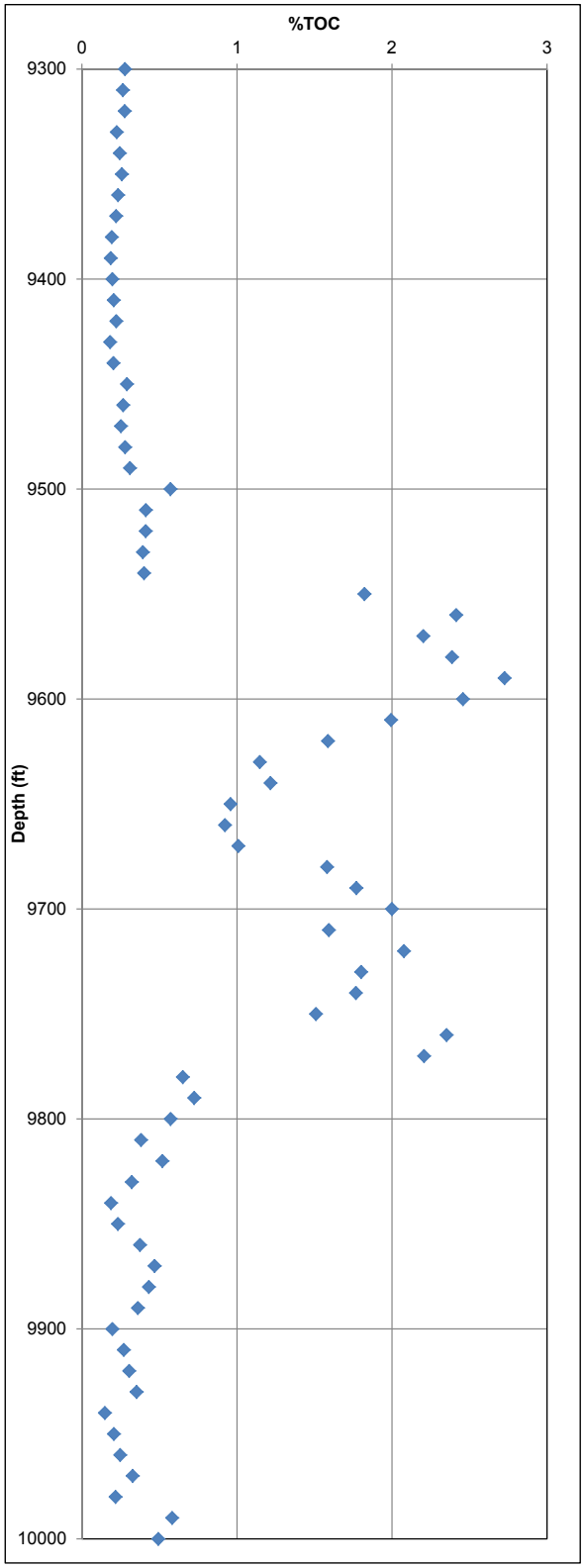
31-107-23883-00-00		
API	Depth (ft)	% TOC
31-107-23883-00-00	10000	0.50
31-107-23883-00-00	10010	0.84
31-107-23883-00-00	10020	1.74
31-107-23883-00-00	10030	2.50
31-107-23883-00-00	10040	2.74
31-107-23883-00-00	10050	2.96
31-107-23883-00-00	10060	2.93
31-107-23883-00-00	10070	2.53
31-107-23883-00-00	10080	2.57
31-107-23883-00-00	10090	1.93
31-107-23883-00-00	10100	2.09
31-107-23883-00-00	10110	2.25
31-107-23883-00-00	10120	1.97
31-107-23883-00-00	10130	2.06
31-107-23883-00-00	10140	2.05
31-107-23883-00-00	10150	1.95
31-107-23883-00-00	10160	0.83
31-107-23883-00-00	10170	1.60
31-107-23883-00-00	10180	1.59
31-107-23883-00-00	10190	2.23
31-107-23883-00-00	10200	1.75
31-107-23883-00-00	10210	2.30
31-107-23883-00-00	10220	2.37
31-107-23883-00-00	10230	2.16
31-107-23883-00-00	10240	1.73
31-107-23883-00-00	10250	1.92
31-107-23883-00-00	10260	1.90
31-107-23883-00-00	10270	1.17
31-107-23883-00-00	10280	0.54
31-107-23883-00-00	10290	0.61
31-107-23883-00-00	10300	
31-107-23883-00-00	10310	1.02
31-107-23883-00-00	10320	0.36
31-107-23883-00-00	10330	0.29
31-107-23883-00-00	10340	0.28
31-107-23883-00-00	10350	0.30
31-107-23883-00-00	10360	0.41
31-107-23883-00-00	10370	0.42
31-107-23883-00-00	10380	0.38
31-107-23883-00-00	10390	0.40
31-107-23883-00-00	10400	0.41
31-107-23883-00-00	10410	0.28
31-107-23883-00-00	10420	0.40
31-107-23883-00-00	10430	0.39
31-107-23883-00-00	10440	0.41
31-107-23883-00-00	10450	0.68
31-107-23883-00-00	10460	0.57
31-107-23883-00-00	10470	1.20
31-107-23883-00-00	10480	0.64
31-107-23883-00-00	10490	0.37
31-107-23883-00-00	10500	0.38
31-107-23883-00-00	10510	0.43
31-107-23883-00-00	10520	0.35
31-107-23883-00-00	10530	0.36
31-107-23883-00-00	10540	0.33
31-107-23883-00-00	10550	0.60
31-107-23883-00-00	10560	0.73
31-107-23883-00-00	10570	
31-107-23883-00-00	10580	0.47
31-107-23883-00-00	10590	0.67
31-107-23883-00-00	10600	0.59
31-107-23883-00-00	10610	0.62
31-107-23883-00-00	10620	0.34
31-107-23883-00-00	10630	0.21
31-107-23883-00-00	10640	0.22
31-107-23883-00-00	10650	0.27
31-107-23883-00-00	10660	0.23
31-107-23883-00-00	10670	0.44
31-107-23883-00-00	10680	0.32
31-107-23883-00-00	10690	0.15
31-107-23883-00-00	10700	0.14
Duplicates		
31-107-23883-00-00	10030-2	2.55
31-107-23883-00-00	10130-2	2.05
31-107-23883-00-00	10260-2	1.84



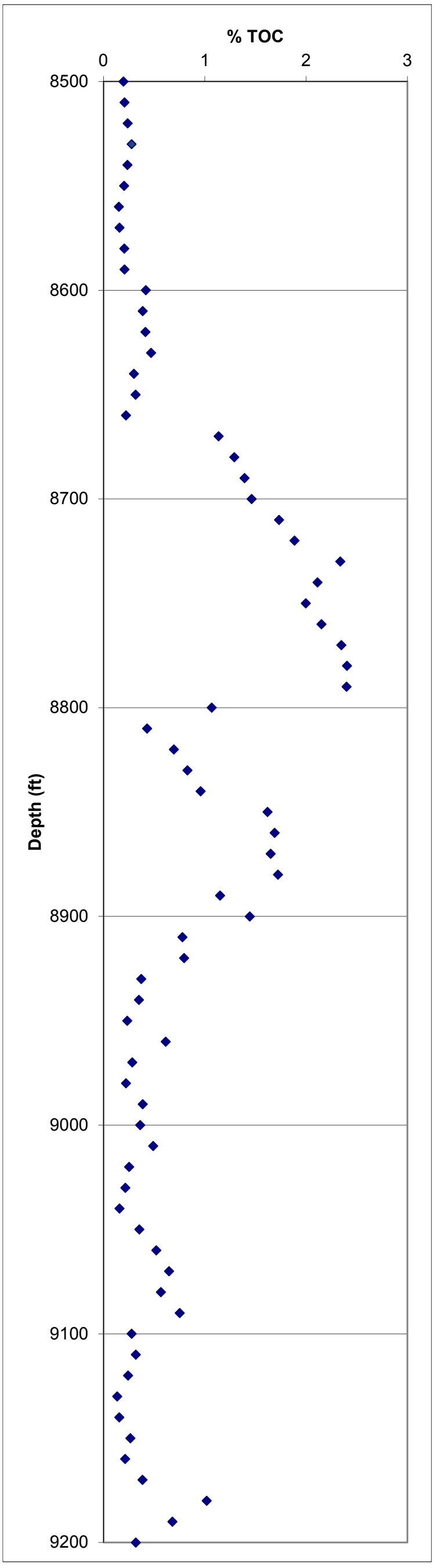
31-107-23927-00-00			
API	Depth (ft)	% TOC	wt% Carbonate
31-107-23927-00-00	9110	0.41	16.26
31-107-23927-00-00	9120	0.81	17.89
31-107-23927-00-00	9130	1.23	18.04
31-107-23927-00-00	9140	1.22	17.45
31-107-23927-00-00	9150	1.21	16.55
31-107-23927-00-00	9160	0.89	17.02
31-107-23927-00-00	9170	1.17	17.14
31-107-23927-00-00	9180	1.13	17.67
31-107-23927-00-00	9190	1.30	16.76
31-107-23927-00-00	9200	1.30	17.77
31-107-23927-00-00	9210	0.99	17.17
31-107-23927-00-00	9220	1.80	26.01
31-107-23927-00-00	9230	1.37	55.38
31-107-23927-00-00	9240	1.23	56.96
31-107-23927-00-00	9250	1.68	65.10
31-107-23927-00-00	9260	1.52	68.08
31-107-23927-00-00	9270	1.85	68.06
31-107-23927-00-00	9280	1.89	69.18
31-107-23927-00-00	9290	1.99	65.07
31-107-23927-00-00	9300	1.88	71.88
31-107-23927-00-00	9310	1.71	75.93
31-107-23927-00-00	9320	1.76	76.09
31-107-23927-00-00	9330	1.75	76.29
31-107-23927-00-00	9340	1.73	75.91
31-107-23927-00-00	9350	1.85	72.85
31-107-23927-00-00	9360	0.68	83.20
31-107-23927-00-00	9370	0.71	81.97
31-107-23927-00-00	9380	0.35	85.58
31-107-23927-00-00	9390	0.27	76.34
31-107-23927-00-00	9400	0.30	79.55
31-107-23927-00-00	9410	0.30	82.24
31-107-23927-00-00	9420	0.46	78.96
31-107-23927-00-00	9430	0.31	79.42
31-107-23927-00-00	9440	0.26	77.79
31-107-23927-00-00	9450	0.52	71.20
31-107-23927-00-00	9460	0.49	68.53
31-107-23927-00-00	9470	0.56	69.82
31-107-23927-00-00	9480	0.35	77.40
31-107-23927-00-00	9490	0.33	82.04
31-107-23927-00-00	9500	0.29	81.64
31-107-23927-00-00	9510	0.32	82.16
31-107-23927-00-00	9520	0.27	81.89
31-107-23927-00-00	9530	0.49	79.28
31-107-23927-00-00	9540	0.67	78.96
31-107-23927-00-00	9550	0.53	74.02
31-107-23927-00-00	9560	0.45	73.46
31-107-23927-00-00	9570	0.40	73.74
31-107-23927-00-00	9580	0.34	73.91
31-107-23927-00-00	9590	0.40	73.12
31-107-23927-00-00	9600	0.41	74.97
31-107-23927-00-00	9610	0.24	77.04
31-107-23927-00-00	9620	0.22	68.69
31-107-23927-00-00	9630	0.42	70.89
31-107-23927-00-00	9640	0.78	72.10
31-107-23927-00-00	9650	0.72	70.90
Duplicates			
31-107-23927-00-00	9190-2	1.26	
31-107-23927-00-00	9290-2	1.95	



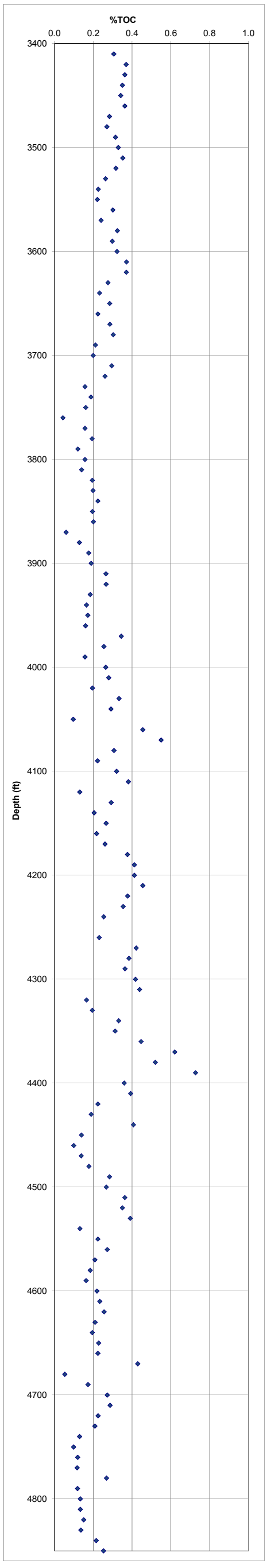
31-107-23996-00-00		
API	Depth (ft)	% TOC
31-107-23996-00-00	9300	0.28
31-107-23996-00-00	9310	0.26
31-107-23996-00-00	9320	0.28
31-107-23996-00-00	9330	0.22
31-107-23996-00-00	9340	0.24
31-107-23996-00-00	9350	0.26
31-107-23996-00-00	9360	0.23
31-107-23996-00-00	9370	0.22
31-107-23996-00-00	9380	0.19
31-107-23996-00-00	9390	0.19
31-107-23996-00-00	9400	0.20
31-107-23996-00-00	9410	0.20
31-107-23996-00-00	9420	0.22
31-107-23996-00-00	9430	0.18
31-107-23996-00-00	9440	0.20
31-107-23996-00-00	9450	0.29
31-107-23996-00-00	9460	0.27
31-107-23996-00-00	9470	0.25
31-107-23996-00-00	9480	0.28
31-107-23996-00-00	9490	0.31
31-107-23996-00-00	9500	0.57
31-107-23996-00-00	9510	0.41
31-107-23996-00-00	9520	0.41
31-107-23996-00-00	9530	0.39
31-107-23996-00-00	9540	0.40
31-107-23996-00-00	9550	1.82
31-107-23996-00-00	9560	2.41
31-107-23996-00-00	9570	2.20
31-107-23996-00-00	9580	2.39
31-107-23996-00-00	9590	2.73
31-107-23996-00-00	9600	2.46
31-107-23996-00-00	9610	1.99
31-107-23996-00-00	9620	1.59
31-107-23996-00-00	9630	1.15
31-107-23996-00-00	9640	1.22
31-107-23996-00-00	9650	0.96
31-107-23996-00-00	9660	0.92
31-107-23996-00-00	9670	1.01
31-107-23996-00-00	9680	1.58
31-107-23996-00-00	9690	1.77
31-107-23996-00-00	9700	2.00
31-107-23996-00-00	9710	1.59
31-107-23996-00-00	9720	2.08
31-107-23996-00-00	9730	1.80
31-107-23996-00-00	9740	1.77
31-107-23996-00-00	9750	1.51
31-107-23996-00-00	9760	2.35
31-107-23996-00-00	9770	2.21
31-107-23996-00-00	9780	0.65
31-107-23996-00-00	9790	0.72
31-107-23996-00-00	9800	0.57
31-107-23996-00-00	9810	0.38
31-107-23996-00-00	9820	0.52
31-107-23996-00-00	9830	0.32
31-107-23996-00-00	9840	0.19
31-107-23996-00-00	9850	0.23
31-107-23996-00-00	9860	0.37
31-107-23996-00-00	9870	0.47
31-107-23996-00-00	9880	0.43
31-107-23996-00-00	9890	0.36
31-107-23996-00-00	9900	0.20
31-107-23996-00-00	9910	0.27
31-107-23996-00-00	9920	0.30
31-107-23996-00-00	9930	0.35
31-107-23996-00-00	9940	0.15
31-107-23996-00-00	9950	0.21
31-107-23996-00-00	9960	0.25
31-107-23996-00-00	9970	0.33
31-107-23996-00-00	9980	0.22
31-107-23996-00-00	9990	0.58
31-107-23996-00-00	10000	0.49
Duplicates		
31-107-23996-00-00	9320-2	0.24
31-107-23996-00-00	9520-2	0.44
31-107-23996-00-00	9720-2	1.89
31-107-23996-00-00	9850-2	0.25
31-107-23996-00-00	10000-2	0.38



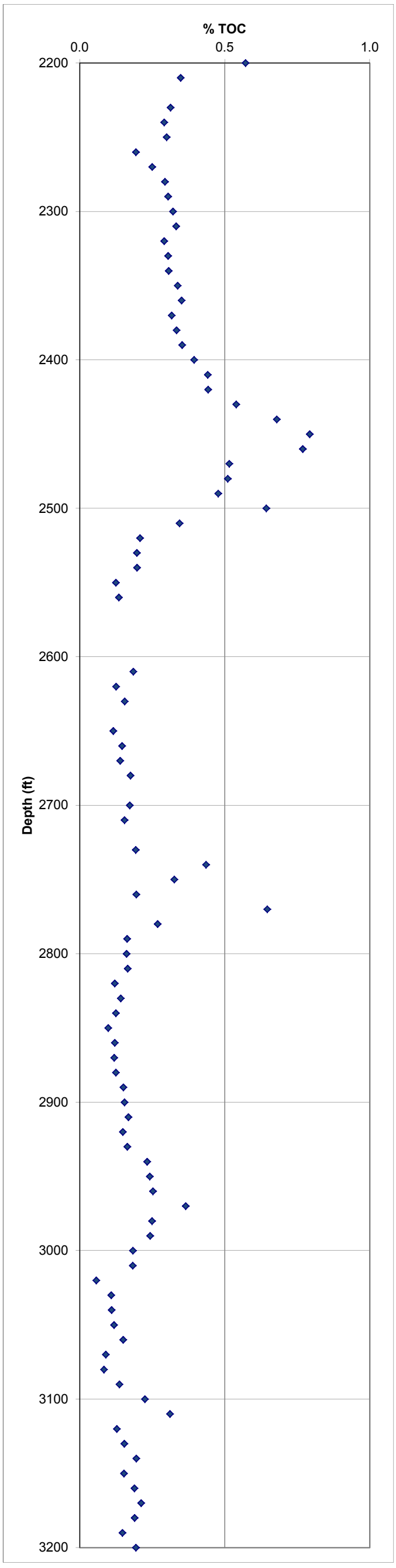
31-107-26013-00-00		
API	Depth (ft)	% TOC
31-107-26013-00-00	8500	0.20
31-107-26013-00-00	8510	0.21
31-107-26013-00-00	8520	0.24
31-107-26013-00-00	8530	0.28
31-107-26013-00-00	8540	0.24
31-107-26013-00-00	8550	0.20
31-107-26013-00-00	8560	0.15
31-107-26013-00-00	8570	0.16
31-107-26013-00-00	8580	0.20
31-107-26013-00-00	8590	0.21
31-107-26013-00-00	8600	0.42
31-107-26013-00-00	8610	0.39
31-107-26013-00-00	8620	0.41
31-107-26013-00-00	8630	0.47
31-107-26013-00-00	8640	0.30
31-107-26013-00-00	8650	0.32
31-107-26013-00-00	8660	0.22
31-107-26013-00-00	8670	1.14
31-107-26013-00-00	8680	1.29
31-107-26013-00-00	8690	1.39
31-107-26013-00-00	8700	1.46
31-107-26013-00-00	8710	1.73
31-107-26013-00-00	8720	1.89
31-107-26013-00-00	8730	2.34
31-107-26013-00-00	8740	2.11
31-107-26013-00-00	8750	2.00
31-107-26013-00-00	8760	2.15
31-107-26013-00-00	8770	2.35
31-107-26013-00-00	8780	2.40
31-107-26013-00-00	8790	2.40
31-107-26013-00-00	8800	1.07
31-107-26013-00-00	8810	0.43
31-107-26013-00-00	8820	0.69
31-107-26013-00-00	8830	0.83
31-107-26013-00-00	8840	0.96
31-107-26013-00-00	8850	1.62
31-107-26013-00-00	8860	1.69
31-107-26013-00-00	8870	1.65
31-107-26013-00-00	8880	1.72
31-107-26013-00-00	8890	1.15
31-107-26013-00-00	8900	1.44
31-107-26013-00-00	8910	0.78
31-107-26013-00-00	8920	0.80
31-107-26013-00-00	8930	0.37
31-107-26013-00-00	8940	0.35
31-107-26013-00-00	8950	0.24
31-107-26013-00-00	8960	0.61
31-107-26013-00-00	8970	0.28
31-107-26013-00-00	8980	0.22
31-107-26013-00-00	8990	0.39
31-107-26013-00-00	9000	0.36
31-107-26013-00-00	9010	0.49
31-107-26013-00-00	9020	0.25
31-107-26013-00-00	9030	0.22
31-107-26013-00-00	9040	0.16
31-107-26013-00-00	9050	0.35
31-107-26013-00-00	9060	0.52
31-107-26013-00-00	9070	0.65
31-107-26013-00-00	9080	0.57
31-107-26013-00-00	9090	0.75
31-107-26013-00-00	9100	0.28
31-107-26013-00-00	9110	0.32
31-107-26013-00-00	9120	0.24
31-107-26013-00-00	9130	0.14
31-107-26013-00-00	9140	0.16
31-107-26013-00-00	9150	0.26
31-107-26013-00-00	9160	0.21
31-107-26013-00-00	9170	0.39
31-107-26013-00-00	9180	1.02
31-107-26013-00-00	9190	0.68
31-107-26013-00-00	9200	0.32
Duplicates		
31-107-26013-00-00	8810-2	0.43
31-107-26013-00-00	9050-2	0.36
31-107-26013-00-00	9200-2	0.28



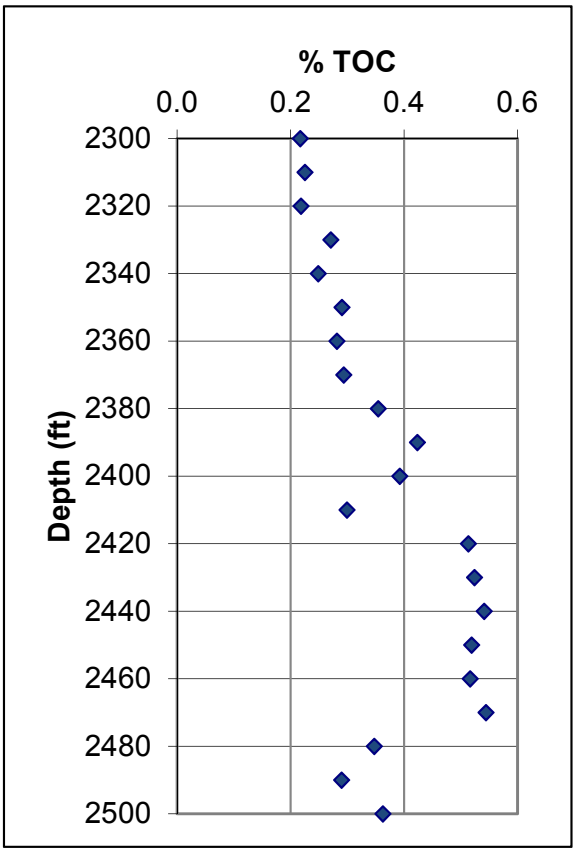
31-115-18370-00-00		
API	Depth (ft)	% TOC
31-115-18370-00-00	3410	0.31
31-115-18370-00-00	3420	0.37
31-115-18370-00-00	3430	0.36
31-115-18370-00-00	3440	0.35
31-115-18370-00-00	3450	0.34
31-115-18370-00-00	3460	0.36
31-115-18370-00-00	3470	0.28
31-115-18370-00-00	3480	0.27
31-115-18370-00-00	3490	0.31
31-115-18370-00-00	3500	0.33
31-115-18370-00-00	3510	0.35
31-115-18370-00-00	3520	0.32
31-115-18370-00-00	3530	0.26
31-115-18370-00-00	3540	0.23
31-115-18370-00-00	3550	0.22
31-115-18370-00-00	3560	0.30
31-115-18370-00-00	3570	0.24
31-115-18370-00-00	3580	0.32
31-115-18370-00-00	3590	0.30
31-115-18370-00-00	3600	0.32
31-115-18370-00-00	3610	0.37
31-115-18370-00-00	3620	0.37
31-115-18370-00-00	3630	0.28
31-115-18370-00-00	3640	0.23
31-115-18370-00-00	3650	0.28
31-115-18370-00-00	3660	0.22
31-115-18370-00-00	3670	0.29
31-115-18370-00-00	3680	0.30
31-115-18370-00-00	3690	0.21
31-115-18370-00-00	3700	0.20
31-115-18370-00-00	3710	0.30
31-115-18370-00-00	3720	0.26
31-115-18370-00-00	3730	0.16
31-115-18370-00-00	3740	0.19
31-115-18370-00-00	3750	0.16
31-115-18370-00-00	3760	0.04
31-115-18370-00-00	3770	0.16
31-115-18370-00-00	3780	0.19
31-115-18370-00-00	3790	0.12
31-115-18370-00-00	3800	0.16
31-115-18370-00-00	3810	0.14
31-115-18370-00-00	3820	0.19
31-115-18370-00-00	3830	0.20
31-115-18370-00-00	3840	0.22
31-115-18370-00-00	3850	0.20
31-115-18370-00-00	3860	0.20
31-115-18370-00-00	3870	0.06
31-115-18370-00-00	3880	0.13
31-115-18370-00-00	3890	0.18
31-115-18370-00-00	3900	0.19
31-115-18370-00-00	3910	0.26
31-115-18370-00-00	3920	0.27
31-115-18370-00-00	3930	0.18
31-115-18370-00-00	3940	0.16
31-115-18370-00-00	3950	0.17
31-115-18370-00-00	3960	0.16
31-115-18370-00-00	3970	0.34
31-115-18370-00-00	3980	0.25
31-115-18370-00-00	3990	0.16
31-115-18370-00-00	4000	0.26
31-115-18370-00-00	4010	0.28
31-115-18370-00-00	4020	0.20
31-115-18370-00-00	4030	0.33
31-115-18370-00-00	4040	0.29
31-115-18370-00-00	4050	0.10
31-115-18370-00-00	4060	0.45
31-115-18370-00-00	4070	0.55
31-115-18370-00-00	4080	0.31
31-115-18370-00-00	4090	0.22
31-115-18370-00-00	4100	0.32
31-115-18370-00-00	4110	0.38
31-115-18370-00-00	4120	0.13
31-115-18370-00-00	4130	0.29
31-115-18370-00-00	4140	0.20
31-115-18370-00-00	4150	0.27
31-115-18370-00-00	4160	0.22
31-115-18370-00-00	4170	0.26
31-115-18370-00-00	4180	0.38
31-115-18370-00-00	4190	0.41
31-115-18370-00-00	4200	0.41
31-115-18370-00-00	4210	0.45
31-115-18370-00-00	4220	0.38
31-115-18370-00-00	4230	0.35
31-115-18370-00-00	4240	0.25
31-115-18370-00-00	4250	
31-115-18370-00-00	4260	0.23
31-115-18370-00-00	4270	0.42
31-115-18370-00-00	4280	0.38
31-115-18370-00-00	4290	0.36
31-115-18370-00-00	4300	0.42
31-115-18370-00-00	4310	0.44
31-115-18370-00-00	4320	0.16
31-115-18370-00-00	4330	0.19
31-115-18370-00-00	4340	0.33
31-115-18370-00-00	4350	0.31
31-115-18370-00-00	4360	0.45
31-115-18370-00-00	4370	0.62
31-115-18370-00-00	4380	0.52
31-115-18370-00-00	4390	0.73
31-115-18370-00-00	4400	0.36
31-115-18370-00-00	4410	0.39
31-115-18370-00-00	4420	0.22
31-115-18370-00-00	4430	0.19
31-115-18370-00-00	4440	0.41
31-115-18370-00-00	4450	0.14
31-115-18370-00-00	4460	0.10
31-115-18370-00-00	4470	0.14
31-115-18370-00-00	4480	0.18
31-115-18370-00-00	4490	0.28
31-115-18370-00-00	4500	0.27
31-115-18370-00-00	4510	0.36
31-115-18370-00-00	4520	0.35
31-115-18370-00-00	4530	0.39
31-115-18370-00-00	4540	0.13
31-115-18370-00-00	4550	0.22
31-115-18370-00-00	4560	0.27
31-115-18370-00-00	4570	0.21
31-115-18370-00-00	4580	0.18
31-115-18370-00-00	4590	0.16
31-115-18370-00-00	4600	0.22
31-115-18370-00-00	4610	0.23
31-115-18370-00-00	4620	0.26
31-115-18370-00-00	4630	0.21
31-115-18370-00-00	4640	0.19
31-115-18370-00-00	4650	0.23
31-115-18370-00-00	4660	0.22
31-115-18370-00-00	4670	0.43
31-115-18370-00-00	4680	0.05
31-115-18370-00-00	4690	0.17
31-115-18370-00-00	4700	0.27
31-115-18370-00-00	4710	0.29
31-115-18370-00-00	4720	0.22
31-115-18370-00-00	4730	0.21
31-115-18370-00-00	4740	0.13
31-115-18370-00-00	4750	0.10
31-115-18370-00-00	4760	0.12
31-115-18370-00-00	4770	0.12
31-115-18370-00-00	4780	0.27
31-115-18370-00-00	4790	0.12
31-115-18370-00-00	4800	0.13
31-115-18370-00-00	4810	0.13
31-115-18370-00-00	4820	0.15
31-115-18370-00-00	4830	0.14
31-115-18370-00-00	4840	0.21
31-115-18370-00-00	4850	0.25
Duplicates		
31-115-18370-00-00	3510-2	0.32
31-115-18370-00-00	3810-2	0.20
31-115-18370-00-00	4030-2	0.38
31-115-18370-00-00	4240-2	0.25
31-115-18370-00-00	4350-2	0.34
31-115-18370-00-00	4470-2	0.25
31-115-18370-00-00	4710-2	0.22



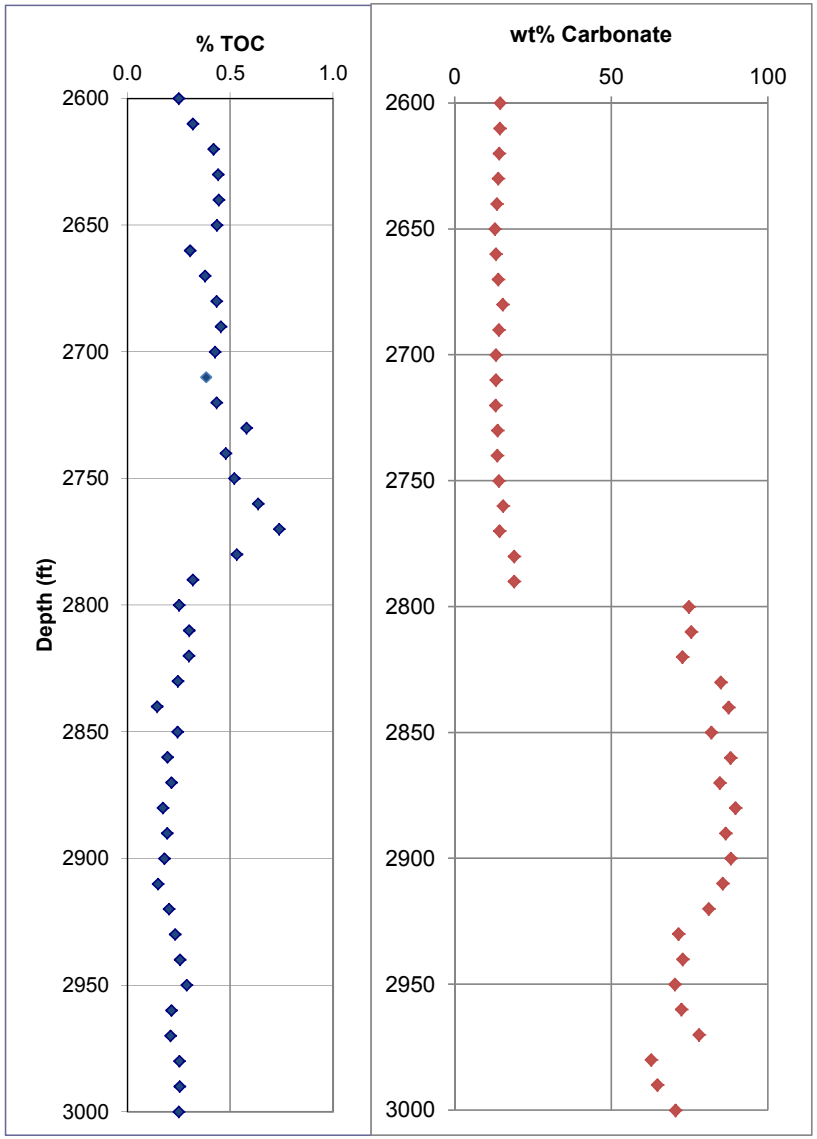
31-117-04754-00-00		
API	Depth (ft)	% TOC
31-117-04754-00-00	2200	0.57
31-117-04754-00-00	2210	0.35
31-117-04754-00-00	2230	0.31
31-117-04754-00-00	2240	0.29
31-117-04754-00-00	2250	0.30
31-117-04754-00-00	2260	0.19
31-117-04754-00-00	2270	0.25
31-117-04754-00-00	2280	0.29
31-117-04754-00-00	2290	0.30
31-117-04754-00-00	2300	0.32
31-117-04754-00-00	2310	0.33
31-117-04754-00-00	2320	0.29
31-117-04754-00-00	2330	0.30
31-117-04754-00-00	2340	0.31
31-117-04754-00-00	2350	0.34
31-117-04754-00-00	2360	0.35
31-117-04754-00-00	2370	0.32
31-117-04754-00-00	2380	0.33
31-117-04754-00-00	2390	0.35
31-117-04754-00-00	2400	0.39
31-117-04754-00-00	2410	0.44
31-117-04754-00-00	2420	0.44
31-117-04754-00-00	2430	0.54
31-117-04754-00-00	2440	0.68
31-117-04754-00-00	2450	0.79
31-117-04754-00-00	2460	0.77
31-117-04754-00-00	2470	0.52
31-117-04754-00-00	2480	0.51
31-117-04754-00-00	2490	0.48
31-117-04754-00-00	2500	0.64
31-117-04754-00-00	2510	0.34
31-117-04754-00-00	2520	0.21
31-117-04754-00-00	2530	0.20
31-117-04754-00-00	2540	0.20
31-117-04754-00-00	2550	0.13
31-117-04754-00-00	2560	0.13
31-117-04754-00-00	2610	0.18
31-117-04754-00-00	2620	0.13
31-117-04754-00-00	2630	0.16
31-117-04754-00-00	2650	0.12
31-117-04754-00-00	2660	0.15
31-117-04754-00-00	2670	0.14
31-117-04754-00-00	2680	0.18
31-117-04754-00-00	2700	0.17
31-117-04754-00-00	2710	0.15
31-117-04754-00-00	2730	0.19
31-117-04754-00-00	2740	0.44
31-117-04754-00-00	2750	0.33
31-117-04754-00-00	2760	0.20
31-117-04754-00-00	2770	0.65
31-117-04754-00-00	2780	0.27
31-117-04754-00-00	2790	0.16
31-117-04754-00-00	2800	0.16
31-117-04754-00-00	2810	0.17
31-117-04754-00-00	2820	0.12
31-117-04754-00-00	2830	0.14
31-117-04754-00-00	2840	0.12
31-117-04754-00-00	2850	0.10
31-117-04754-00-00	2860	0.12
31-117-04754-00-00	2870	0.12
31-117-04754-00-00	2880	0.12
31-117-04754-00-00	2890	0.15
31-117-04754-00-00	2900	0.15
31-117-04754-00-00	2910	0.17
31-117-04754-00-00	2920	0.15
31-117-04754-00-00	2930	0.16
31-117-04754-00-00	2940	0.23
31-117-04754-00-00	2950	0.24
31-117-04754-00-00	2960	0.25
31-117-04754-00-00	2970	0.37
31-117-04754-00-00	2980	0.25
31-117-04754-00-00	2990	0.24
31-117-04754-00-00	3000	0.18
31-117-04754-00-00	3010	0.18
31-117-04754-00-00	3020	0.06
31-117-04754-00-00	3030	0.11
31-117-04754-00-00	3040	0.11
31-117-04754-00-00	3050	0.12
31-117-04754-00-00	3060	0.15
31-117-04754-00-00	3070	0.09
31-117-04754-00-00	3080	0.08
31-117-04754-00-00	3090	0.14
31-117-04754-00-00	3100	0.22
31-117-04754-00-00	3110	0.31
31-117-04754-00-00	3120	0.13
31-117-04754-00-00	3130	0.15
31-117-04754-00-00	3140	0.20
31-117-04754-00-00	3150	0.15
31-117-04754-00-00	3160	0.19
31-117-04754-00-00	3170	0.21
31-117-04754-00-00	3180	0.19
31-117-04754-00-00	3190	0.15
31-117-04754-00-00	3200	0.19
Duplicates		
31-117-04754-00-00	2270-2	0.27
31-117-04754-00-00	2500-2	0.62
31-117-04754-00-00	2800-2	0.17
31-117-04754-00-00	3030-2	0.13
31-117-04754-00-00	3200-2	0.19



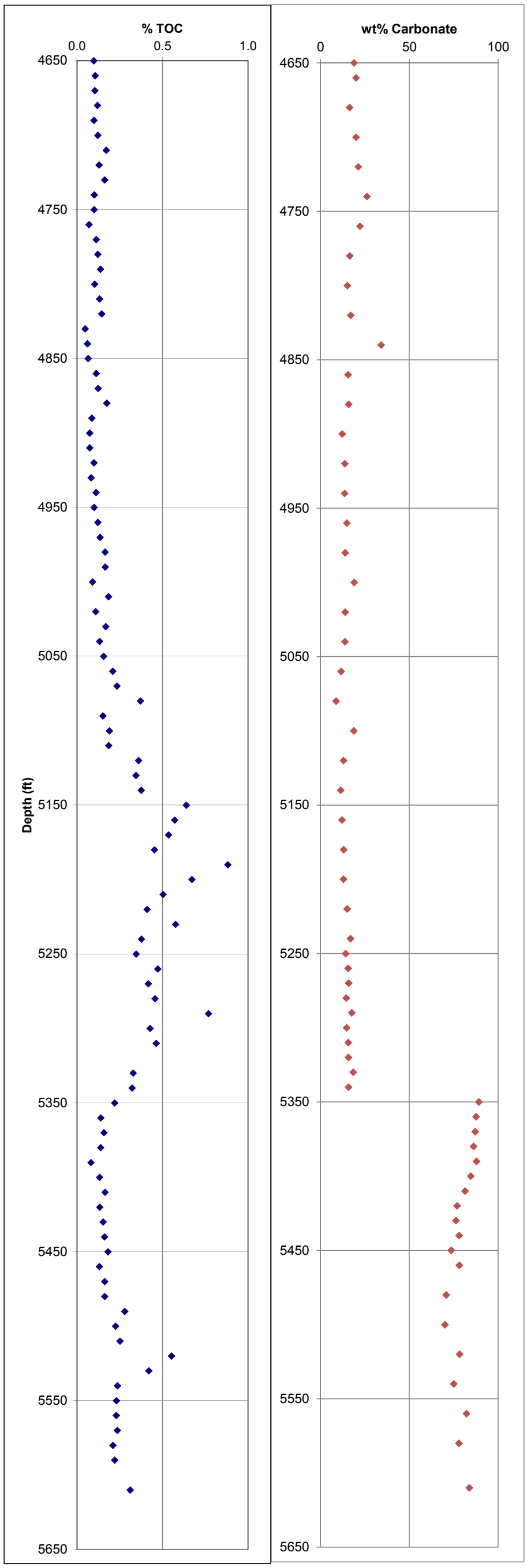
31-117-05114-00-00		
API	Depth (ft)	% TOC
31-117-05114-00-00	2300	0.22
31-117-05114-00-00	2310	0.23
31-117-05114-00-00	2320	0.22
31-117-05114-00-00	2330	0.27
31-117-05114-00-00	2340	0.25
31-117-05114-00-00	2350	0.29
31-117-05114-00-00	2360	0.28
31-117-05114-00-00	2370	0.29
31-117-05114-00-00	2380	0.35
31-117-05114-00-00	2390	0.42
31-117-05114-00-00	2400	0.39
31-117-05114-00-00	2410	0.30
31-117-05114-00-00	2420	0.51
31-117-05114-00-00	2430	0.52
31-117-05114-00-00	2440	0.54
31-117-05114-00-00	2450	0.52
31-117-05114-00-00	2460	0.52
31-117-05114-00-00	2470	0.54
31-117-05114-00-00	2480	0.35
31-117-05114-00-00	2490	0.29
31-117-05114-00-00	2500	0.36
Duplicates		
31-117-05114-00-00	2440-2	2.37



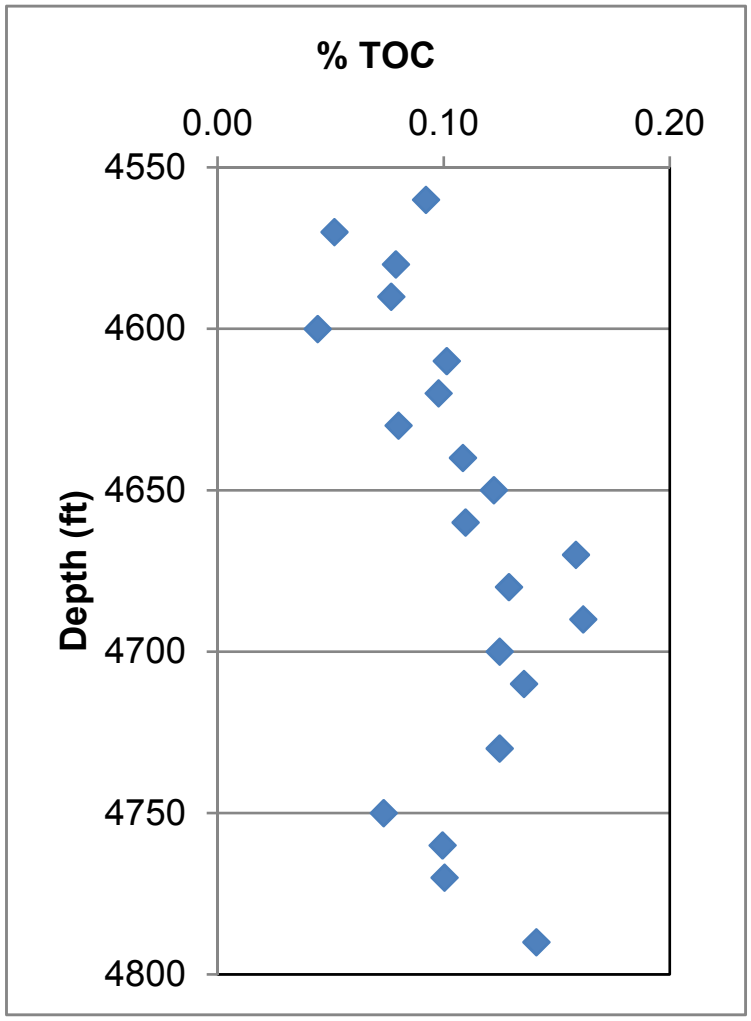
31-117-06719-00-00			
API	Depth (ft)	% TOC	wt% Carbonate
31-117-06719-00-00	2600	0.25	14.47
31-117-06719-00-00	2610	0.32	14.34
31-117-06719-00-00	2620	0.42	14.18
31-117-06719-00-00	2630	0.44	13.83
31-117-06719-00-00	2640	0.44	13.42
31-117-06719-00-00	2650	0.43	12.84
31-117-06719-00-00	2660	0.30	13.12
31-117-06719-00-00	2670	0.38	13.81
31-117-06719-00-00	2680	0.43	15.34
31-117-06719-00-00	2690	0.45	14.06
31-117-06719-00-00	2700	0.43	13.13
31-117-06719-00-00	2710	0.38	13.13
31-117-06719-00-00	2720	0.43	13.02
31-117-06719-00-00	2730	0.58	13.59
31-117-06719-00-00	2740	0.48	13.56
31-117-06719-00-00	2750	0.52	14.06
31-117-06719-00-00	2760	0.63	15.45
31-117-06719-00-00	2770	0.74	14.22
31-117-06719-00-00	2780	0.53	18.93
31-117-06719-00-00	2790	0.32	18.90
31-117-06719-00-00	2800	0.25	74.68
31-117-06719-00-00	2810	0.30	75.47
31-117-06719-00-00	2820	0.30	72.60
31-117-06719-00-00	2830	0.24	84.88
31-117-06719-00-00	2840	0.14	87.38
31-117-06719-00-00	2850	0.24	81.93
31-117-06719-00-00	2860	0.19	88.05
31-117-06719-00-00	2870	0.21	84.65
31-117-06719-00-00	2880	0.17	89.60
31-117-06719-00-00	2890	0.19	86.52
31-117-06719-00-00	2900	0.18	88.10
31-117-06719-00-00	2910	0.15	85.50
31-117-06719-00-00	2920	0.20	81.03
31-117-06719-00-00	2930	0.23	71.46
31-117-06719-00-00	2940	0.26	72.79
31-117-06719-00-00	2950	0.29	70.31
31-117-06719-00-00	2960	0.21	72.38
31-117-06719-00-00	2970	0.21	77.97
31-117-06719-00-00	2980	0.25	62.63
31-117-06719-00-00	2990	0.25	64.69
31-117-06719-00-00	3000	0.25	70.43
Duplicates			
31-117-06719-00-00	2690-2	0.40	
31-117-06719-00-00	2930-2	0.29	



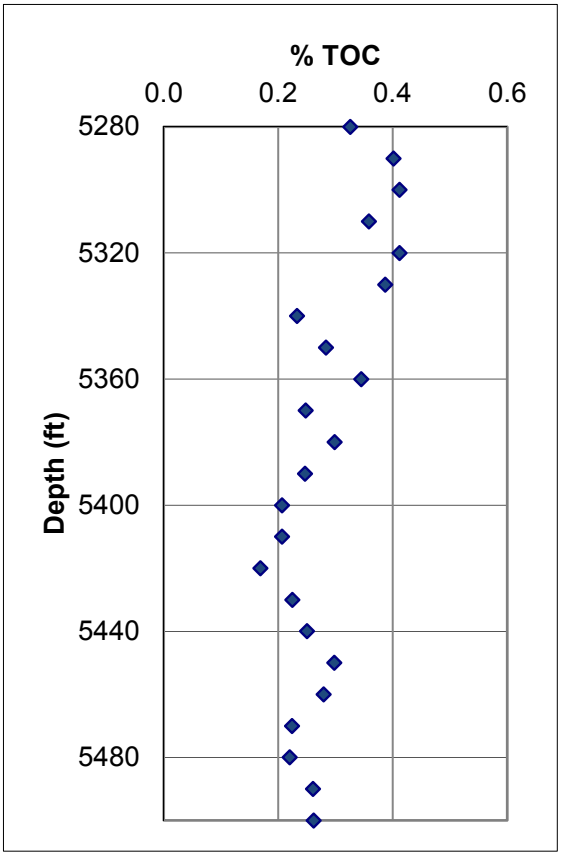
31-121-04092-00-00			
API	Depth (ft)	% TOC	wt% Carbonate
31-121-04092-00-00	4650	0.10	18.84
31-121-04092-00-00	4660	0.11	20.00
31-121-04092-00-00	4670	0.11	
31-121-04092-00-00	4680	0.12	16.28
31-121-04092-00-00	4690	0.10	
31-121-04092-00-00	4700	0.12	19.97
31-121-04092-00-00	4710	0.17	
31-121-04092-00-00	4720	0.13	21.21
31-121-04092-00-00	4730	0.16	
31-121-04092-00-00	4740	0.10	26.10
31-121-04092-00-00	4750	0.10	
31-121-04092-00-00	4760	0.07	22.16
31-121-04092-00-00	4770	0.11	
31-121-04092-00-00	4780	0.12	16.37
31-121-04092-00-00	4790	0.14	
31-121-04092-00-00	4800	0.10	15.03
31-121-04092-00-00	4810	0.13	
31-121-04092-00-00	4820	0.14	16.96
31-121-04092-00-00	4830	0.05	
31-121-04092-00-00	4840	0.06	34.05
31-121-04092-00-00	4850	0.07	
31-121-04092-00-00	4860	0.11	15.49
31-121-04092-00-00	4870	0.12	
31-121-04092-00-00	4880	0.17	15.75
31-121-04092-00-00	4890	0.09	
31-121-04092-00-00	4900	0.07	12.15
31-121-04092-00-00	4910	0.08	
31-121-04092-00-00	4920	0.10	13.64
31-121-04092-00-00	4930	0.08	
31-121-04092-00-00	4940	0.11	13.51
31-121-04092-00-00	4950	0.10	
31-121-04092-00-00	4960	0.12	14.74
31-121-04092-00-00	4970	0.14	
31-121-04092-00-00	4980	0.16	13.84
31-121-04092-00-00	4990	0.17	
31-121-04092-00-00	5000	0.09	18.88
31-121-04092-00-00	5010	0.19	
31-121-04092-00-00	5020	0.11	13.86
31-121-04092-00-00	5030	0.17	
31-121-04092-00-00	5040	0.13	13.70
31-121-04092-00-00	5050	0.16	
31-121-04092-00-00	5060	0.21	11.55
31-121-04092-00-00	5070	0.23	
31-121-04092-00-00	5080	0.37	8.76
31-121-04092-00-00	5090	0.15	
31-121-04092-00-00	5100	0.19	18.68
31-121-04092-00-00	5110	0.19	
31-121-04092-00-00	5120	0.36	12.90
31-121-04092-00-00	5130	0.35	
31-121-04092-00-00	5140	0.38	11.34
31-121-04092-00-00	5150	0.64	
31-121-04092-00-00	5160	0.57	12.00
31-121-04092-00-00	5170	0.54	
31-121-04092-00-00	5180	0.45	13.00
31-121-04092-00-00	5190	0.88	
31-121-04092-00-00	5200	0.67	12.84
31-121-04092-00-00	5210	0.50	
31-121-04092-00-00	5220	0.41	14.91
31-121-04092-00-00	5230	0.58	
31-121-04092-00-00	5240	0.38	16.84
31-121-04092-00-00	5250	0.35	14.11
31-121-04092-00-00	5260	0.47	15.48
31-121-04092-00-00	5270	0.42	15.77
31-121-04092-00-00	5280	0.46	14.41
31-121-04092-00-00	5290	0.77	17.59
31-121-04092-00-00	5300	0.43	14.63
31-121-04092-00-00	5310	0.46	15.63
31-121-04092-00-00	5320		15.67
31-121-04092-00-00	5330	0.33	18.42
31-121-04092-00-00	5340	0.32	15.69
31-121-04092-00-00	5350	0.22	89.10
31-121-04092-00-00	5360	0.14	87.50
31-121-04092-00-00	5370	0.16	87.01
31-121-04092-00-00	5380	0.14	86.09
31-121-04092-00-00	5390	0.08	87.77
31-121-04092-00-00	5400	0.13	84.55
31-121-04092-00-00	5410	0.16	81.29
31-121-04092-00-00	5420	0.13	76.80
31-121-04092-00-00	5430	0.15	76.24
31-121-04092-00-00	5440	0.16	77.97
31-121-04092-00-00	5450	0.18	73.46
31-121-04092-00-00	5460	0.13	78.11
31-121-04092-00-00	5470	0.16	
31-121-04092-00-00	5480	0.16	70.64
31-121-04092-00-00	5490	0.28	
31-121-04092-00-00	5500	0.23	70.01
31-121-04092-00-00	5510	0.25	
31-121-04092-00-00	5520	0.55	78.28
31-121-04092-00-00	5530	0.42	
31-121-04092-00-00	5540	0.24	74.91
31-121-04092-00-00	5550	0.23	
31-121-04092-00-00	5560	0.23	82.14
31-121-04092-00-00	5570	0.24	
31-121-04092-00-00	5580	0.21	77.83
31-121-04092-00-00	5590	0.22	
31-121-04092-00-00	5610	0.31	83.72
Duplicates			
31-121-04092-00-00	5140-2	0.43	
31-121-04092-00-00	5180-2	0.51	
31-121-04092-00-00	4880-2	0.09	
31-121-04092-00-00	4770-2	0.09	



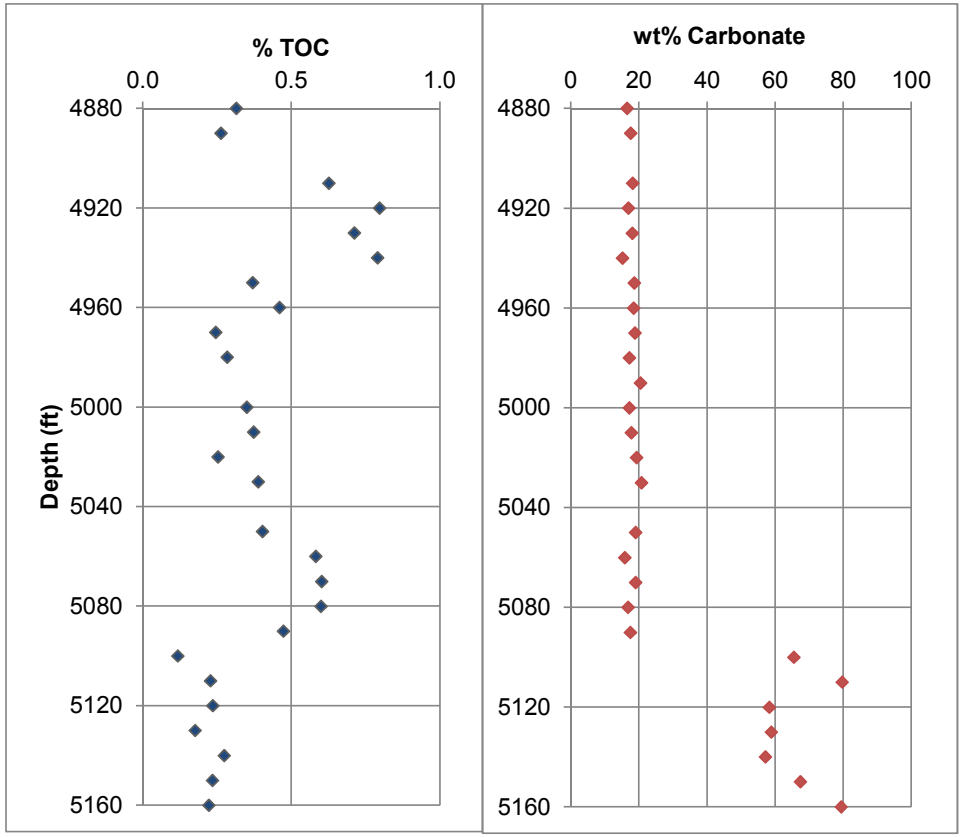
31-121-06073-00-00		
API	Depth (ft)	% TOC
31-121-06073-00-00	4560	0.09
31-121-06073-00-00	4570	0.05
31-121-06073-00-00	4580	0.08
31-121-06073-00-00	4590	0.08
31-121-06073-00-00	4600	0.04
31-121-06073-00-00	4610	0.10
31-121-06073-00-00	4620	0.10
31-121-06073-00-00	4630	0.08
31-121-06073-00-00	4640	0.11
31-121-06073-00-00	4650	0.12
31-121-06073-00-00	4660	0.11
31-121-06073-00-00	4670	0.16
31-121-06073-00-00	4680	0.13
31-121-06073-00-00	4690	0.16
31-121-06073-00-00	4700	0.12
31-121-06073-00-00	4710	0.14
31-121-06073-00-00	4730	0.12
31-121-06073-00-00	4750	0.07
31-121-06073-00-00	4760	0.10
31-121-06073-00-00	4770	0.10
31-121-06073-00-00	4790	0.14
Duplicates		
31-121-06073-00-00	4600-2	0.10
31-121-06073-00-00	4790-2	0.18



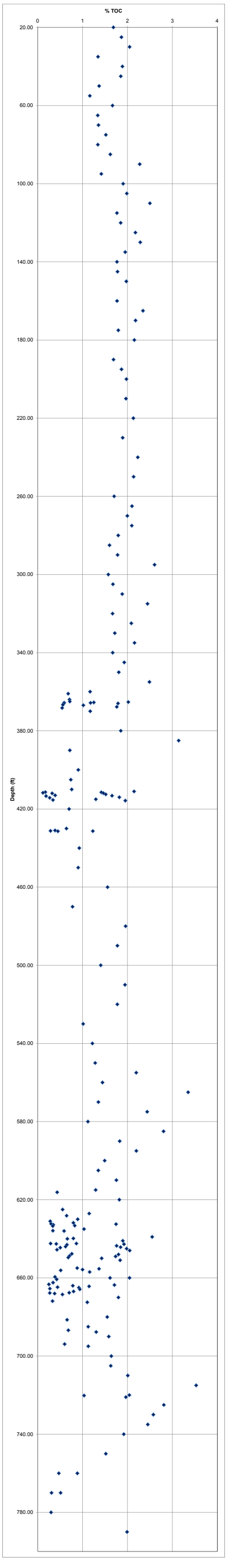
31-121-22520-00-00		
API	Depth (ft)	% TOC
31-121-22520-00-00	5280	0.33
31-121-22520-00-00	5290	0.40
31-121-22520-00-00	5300	0.41
31-121-22520-00-00	5310	0.36
31-121-22520-00-00	5320	0.41
31-121-22520-00-00	5330	0.39
31-121-22520-00-00	5340	0.23
31-121-22520-00-00	5350	0.28
31-121-22520-00-00	5360	0.34
31-121-22520-00-00	5370	0.25
31-121-22520-00-00	5380	0.30
31-121-22520-00-00	5390	0.25
31-121-22520-00-00	5400	0.21
31-121-22520-00-00	5410	0.21
31-121-22520-00-00	5420	0.17
31-121-22520-00-00	5430	0.22
31-121-22520-00-00	5440	0.25
31-121-22520-00-00	5450	0.30
31-121-22520-00-00	5460	0.28
31-121-22520-00-00	5470	0.22
31-121-22520-00-00	5480	0.22
31-121-22520-00-00	5490	0.26
31-121-22520-00-00	5500	0.26
Duplicates		
31-121-22520-00-00	5340-2	0.32
31-121-22520-00-00	5500-2	0.29



31-121-22655-00-00			
API	Depth (ft)	% TOC	wt% Carbonate
31-121-22655-00-00	4880	0.31	16.47
31-121-22655-00-00	4890	0.26	17.56
31-121-22655-00-00	4910	0.63	18.08
31-121-22655-00-00	4920	0.80	16.90
31-121-22655-00-00	4930	0.71	18.01
31-121-22655-00-00	4940	0.79	15.17
31-121-22655-00-00	4950	0.37	18.60
31-121-22655-00-00	4960	0.46	18.36
31-121-22655-00-00	4970	0.25	18.75
31-121-22655-00-00	4980	0.28	17.14
31-121-22655-00-00	4990		20.37
31-121-22655-00-00	5000	0.35	17.19
31-121-22655-00-00	5010	0.37	17.77
31-121-22655-00-00	5020	0.25	19.28
31-121-22655-00-00	5030	0.39	20.73
31-121-22655-00-00	5050	0.40	18.98
31-121-22655-00-00	5060	0.58	15.78
31-121-22655-00-00	5070	0.60	18.94
31-121-22655-00-00	5080	0.60	16.81
31-121-22655-00-00	5090	0.47	17.44
31-121-22655-00-00	5100	0.12	65.46
31-121-22655-00-00	5110	0.23	79.65
31-121-22655-00-00	5120	0.24	58.21
31-121-22655-00-00	5130	0.18	58.82
31-121-22655-00-00	5140	0.27	57.13
31-121-22655-00-00	5150	0.23	67.39
31-121-22655-00-00	5160	0.22	79.37
Duplicates			
31-121-22655-00-00	4960-2	0.52	



74-NY-5			
API	Depth (ft)	% TOC	Notes
74-NY-5	20.00	1.69	Core
74-NY-5	25.00	1.87	Core
74-NY-5	30.00	2.05	Core
74-NY-5	35.00	1.35	Core
74-NY-5	40.00	1.89	Core
74-NY-5	45.00	1.85	Core
74-NY-5	50.00	1.37	Core
74-NY-5	55.00	1.16	Core
74-NY-5	60.00	1.67	Core
74-NY-5	65.00	1.34	Core
74-NY-5	70.00	1.35	Core
74-NY-5	75.00	1.52	Core
74-NY-5	80.00	1.34	Core
74-NY-5	85.00	1.62	Core
74-NY-5	90.00	2.27	Core
74-NY-5	95.00	1.42	Core
74-NY-5	100.00	1.90	Core
74-NY-5	105.00	1.99	Core
74-NY-5	110.00	2.50	Core
74-NY-5	115.00	1.77	Core
74-NY-5	120.00	1.85	Core
74-NY-5	125.00	2.18	Core
74-NY-5	130.00	2.29	Core
74-NY-5	135.00	1.95	Core
74-NY-5	140.00	1.77	Core
74-NY-5	145.00	1.78	Core
74-NY-5	150.00	1.97	Core
74-NY-5	160.00	1.77	Core
74-NY-5	165.00	2.35	Core
74-NY-5	170.00	2.18	Core
74-NY-5	175.00	1.80	Core
74-NY-5	180.00	2.15	Core
74-NY-5	190.00	1.69	Core
74-NY-5	195.00	1.87	Core
74-NY-5	200.00	1.98	Core
74-NY-5	210.00	1.97	Core
74-NY-5	220.00	2.13	Core
74-NY-5	230.00	1.89	Core
74-NY-5	240.00	2.23	Core
74-NY-5	250.00	2.14	Core
74-NY-5	260.00	1.70	Core
74-NY-5	265.00	2.10	Core
74-NY-5	270.00	2.00	Core
74-NY-5	275.00	2.10	Core
74-NY-5	280.00	1.79	Core
74-NY-5	285.00	1.60	Core
74-NY-5	290.00	1.78	Core
74-NY-5	295.00	2.60	Core
74-NY-5	300.00	1.57	Core
74-NY-5	305.00	1.68	Core
74-NY-5	310.00	1.88	Core
74-NY-5	315.00	2.45	Core
74-NY-5	320.00	1.67	Core
74-NY-5	325.00	2.09	Core
74-NY-5	330.00	1.72	Core
74-NY-5	335.00	2.16	Core
74-NY-5	340.00	1.67	Core
74-NY-5	345.00	1.93	Core
74-NY-5	350.00	1.81	Core
74-NY-5	355.00	2.49	Core
74-NY-5	360.00	1.17	Core
74-NY-5	361.00	0.68	Core
74-NY-5	364.00	0.71	Core
74-NY-5	365.00	0.72	Core
74-NY-5	365.30	2.02	Core
74-NY-5	365.45	1.25	Core
74-NY-5	365.60	0.59	Core
74-NY-5	365.70	1.18	Core
74-NY-5	365.90	0.58	Core
74-NY-5	366.00	1.79	Core
74-NY-5	366.70	0.56	Core
74-NY-5	366.90	1.02	Core
74-NY-5	367.75	1.76	Core
74-NY-5	368.30	0.55	Core
74-NY-5	370.00	1.17	Core
74-NY-5	380.00	1.85	Core
74-NY-5	385.00	3.14	Core
74-NY-5	390.00	0.72	Core
74-NY-5	400.00	0.90	Core
74-NY-5	405.00	0.74	Core
74-NY-5	410.00	0.76	Core
74-NY-5	411.00	2.15	Core
74-NY-5	411.40	0.17	Core
74-NY-5	411.50	1.42	Core
74-NY-5	411.70	0.12	Core
74-NY-5	411.90	1.46	Core
74-NY-5	412.00	0.32	Core
74-NY-5	412.50	1.52	Core
74-NY-5	413.00	0.39	Core
74-NY-5	413.20	1.66	Core
74-NY-5	413.40	0.19	Core
74-NY-5	414.00	1.82	Core
74-NY-5	414.30	0.27	Core
74-NY-5	415.00	1.29	Core
74-NY-5	415.40	0.34	Core
74-NY-5	415.70	1.95	Core
74-NY-5	420.00	0.70	Core
74-NY-5	430.00	0.64	Core
74-NY-5	431.00	0.39	Core
74-NY-5	431.20	0.29	Core
74-NY-5	431.30	1.23	Core
74-NY-5	431.40	0.45	Core
74-NY-5	440.00	0.93	Core
74-NY-5	450.00	0.90	Core
74-NY-5	460.00	1.56	Core
74-NY-5	470.00	0.78	Core
74-NY-5	480.00	1.96	Core
74-NY-5	490.00	1.78	Core
74-NY-5	500.00	1.41	Core
74-NY-5	510.00	1.94	Core
74-NY-5	520.00	1.78	Core
74-NY-5	530.00	1.01	Core
74-NY-5	540.00	1.22	Core
74-NY-5	550.00	1.28	Core
74-NY-5	555.00	2.20	Core
74-NY-5	560.00	1.44	Core
74-NY-5	565.00	3.35	Core
74-NY-5	570.00	1.35	Core
74-NY-5	575.00	2.44	Core
74-NY-5	580.00	1.12	Core
74-NY-5	585.00	2.80	Core
74-NY-5	590.00	1.83	Core
74-NY-5	595.00	2.20	Core
74-NY-5	600.00	1.49	Core
74-NY-5	605.00	1.35	Core
74-NY-5	610.00	1.75	Core
74-NY-5	615.00	1.29	Core
74-NY-5	616.16	0.44	Core
74-NY-5	620.00	1.82	Core
74-NY-5	625.00	0.56	Core
74-NY-5	627.08	1.15	Core
74-NY-5	628.16	0.65	Core
74-NY-5	630.00	0.89	Core
74-NY-5	631.00	0.28	Core
74-NY-5	631.83	0.80	Core
74-NY-5	632.33	0.30	Core
74-NY-5	632.50	1.75	Core
74-NY-5	632.80	0.35	Core
74-NY-5	633.24	0.83	Core
74-NY-5	633.50	0.34	Core
74-NY-5	635.00	1.03	Core
74-NY-5	635.84	0.34	Core
74-NY-5	636.00	0.59	Core
74-NY-5	639.00	2.55	Core
74-NY-5	639.80	0.80	Core
74-NY-5	640.00	0.66	Core
74-NY-5	641.00	1.90	Core
74-NY-5	642.40	0.29	Core
74-NY-5	642.41	0.86	Core
74-NY-5	642.59	0.41	Core
74-NY-5	642.75	1.92	Core
74-NY-5	643.00	0.65	Core
74-NY-5	643.60	1.76	Core
74-NY-5	644.00	0.62	Core
74-NY-5	644.30	1.85	Core
74-NY-5	644.50	0.50	Core
74-NY-5	645.00	1.98	Core
74-NY-5	645.60	0.43	Core
74-NY-5	646.00	2.05	Core
74-NY-5	647.67	0.76	Core
74-NY-5	648.00	1.80	Core
74-NY-5	648.75	0.71	Core
74-NY-5	649.00	1.74	Core
74-NY-5	649.60	0.68	Core
74-NY-5	650.00	1.43	Core
74-NY-5	651.00	1.84	Core
74-NY-5	655.00	0.88	Core
74-NY-5	655.33	1.37	Core
74-NY-5	655.75	1.00	Core
74-NY-5	656.16	0.51	Core
74-NY-5	657.00	1.16	Core
74-NY-5	659.50	0.39	Core
74-NY-5	660.00	1.61	Core
74-NY-5	660.00	2.05	Core
74-NY-5	660.75	0.42	Core
74-NY-5	662.41	0.34	Core
74-NY-5	663.33	0.25	Core
74-NY-5	663.63	1.71	Core
74-NY-5	664.00	0.78	Core
74-NY-5	664.33	1.15	Core
74-NY-5	664.75	0.44	Core
74-NY-5	665.00	0.92	Core
74-NY-5	665.50	0.27	Core
74-NY-5	665.83	0.94	Core
74-NY-5	666.96	0.80	Core
74-NY-5	667.60	0.70	Core
74-NY-5	667.75	0.27	Core
74-NY-5	668.00	0.38	Core
74-NY-5	668.46	0.55	Core
74-NY-5	670.00	1.80	Core
74-NY-5	671.87	0.33	Core
74-NY-5	672.46	1.11	Core
74-NY-5	680.00	1.55	Core
74-NY-5	681.46	0.66	Core
74-NY-5	685.00	1.13	Core
74-NY-5	686.79	0.68	Core
74-NY-5	687.71	1.30	Core
74-NY-5	690.00	1.58	Core
74-NY-5	693.87	0.60	Core
74-NY-5	695.00	1.13	Core
74-NY-5	700.00	1.64	Core
74-NY-5	705.00	1.63	Core
74-NY-5	710.00	2.01	Core
74-NY-5	715.00	3.53	Core
74-NY-5	720.00	2.04	Core
74-NY-5	720.21	1.04	Core
74-NY-5	721.00	1.97	Core
74-NY-5	725.00	2.81	Core
74-NY-5	730.00	2.58	Core
74-NY-5	735.00	2.45	Core
74-NY-5	740.00	1.92	Core
74-NY-5	750.00	1.52	Core
74-NY-5	760.00	0.88	Core
74-NY-5	760.00	0.47	Core
74-NY-5	770.00	0.51	Core
74-NY-5	770.00	0.31	Core
74-NY-5	780.00	0.30	Core
74-NY-5	790.00	1.99	Core
Duplicates			
74-NY-5	275.00-2	1.96	Core
74-NY-5	368.30-2	0.60	Core
74-NY-5	657.00-2	1.25	Core
74-NY-5	668.46-2	0.70	Core
74-NY-5	687.71-2	1.20	Core
74-NY-5	668.00-2	0.42	Core
74-NY-5	668.46-2	0.70	Core



APPENDIX B

Humble GeoChem Rock Eval Analyses

Humble Geochemical Services Division

HGS No.	API Number	Well Name	Top Depth (ft.)	Bottom Depth (ft.)	Median Depth (ft.)	Formation Name	Sample Type	Leco TOC	S1	S2	S3	Tmax (°C)		Calc. %Ro	Meas. %Ro	HI	OI	S2/S3	S1/TOC	PI	Notes Checks	Pyrogram
06-3541-137702	31015103350000	Matejka 1	9285		9285	Utica	cuttings	1.56	0.61	0.27	0.26	369.00	*	-1.00		17.00	17.00	1.04	39.00	0.69		lts2p
06-3541-137703	31015103350000	Matejka 1	9295		9295	Utica	cuttings	2.25	0.86	0.40	0.43	379.00	*	-1.00		18.00	19.00	0.93	38.00	0.68	c	lts2p
06-3541-137704	31015103350000	Matejka 1	9300		9300	Utica	cuttings	2.49	0.83	0.33	0.33	371.00	*	-1.00		13.00	13.00	1.00	33.00	0.72		lts2p
06-3541-137705	31015103350000	Matejka 1	9310		9310	Utica	cuttings	2.28	0.73	0.29	0.31	376.00	*	-1.00		13.00	14.00	0.94	32.00	0.72		lts2p
06-3541-137706	31015103350000	Matejka 1	9315		9315	Utica	cuttings	2.26	0.72	0.42	0.31	374.00	*	-1.00		19.00	14.00	1.35	32.00	0.63	lc	lts2p
06-3541-137707	31015103350000	Matejka 1	9330		9330	Utica	cuttings	0.81	0.33	0.14	0.28	373.00	*	-1.00		17.00	35.00	0.50	41.00	0.70		f
06-3541-137708	31101230540000	Hakes 1	9250		9250	Utica	cuttings	0.58	0.25	0.11	0.22	357.00	*	-1.00		19.00	38.00	0.50	43.00	0.69		f
06-3541-137709	31101230540000	Hakes 1	9330		9330	Utica	cuttings	0.67	0.27	0.16	0.20	366.00	*	-1.00		24.00	30.00	0.80	40.00	0.63		f
06-3541-137710	31101230540000	Hakes 1	9370		9370	Utica	cuttings	1.46	0.53	0.57	0.45	405.00		0.13		39.00	31.00	1.27	36.00	0.48	lc	lts2p
06-3541-137711	31101230540000	Hakes 1	9380		9380	Utica	cuttings	1.65	0.35	0.21	0.23	368.00	*	-1.00		13.00	14.00	0.91	21.00	0.62		f
06-3541-137712	31101230540000	Hakes 1	9400		9400	Utica	cuttings	1.68	0.53	0.77	0.40	411.00		0.24		46.00	24.00	1.92	32.00	0.41		lts2p
06-3541-137713	31101230540000	Hakes 1	9410		9410	Utica	cuttings	0.59	0.24	0.18	0.29	392.00	*	-1.00		31.00	49.00	0.62	41.00	0.57	c, lc	f
06-3541-137718	31009092350000	Enterprise St Transit 1	8020		8020	Utica	cuttings	0.27	0.11	0.11	0.11	380.00	*	-1.00		41.00	41.00	1.00	41.00	0.50		f
06-3541-137719	31009092350000	Enterprise St Transit 1	8040		8040	Utica	cuttings	0.31	0.22	0.23	0.15	375.00	*	-1.00		74.00	48.00	1.53	71.00	0.49		f
06-3541-137720	31009092350000	Enterprise St Transit 1	8220		8220	Utica	cuttings	1.08	0.33	0.14	0.16	353.00	*	-1.00		13.00	15.00	0.88	31.00	0.70		f
06-3541-137721	31009092350000	Enterprise St Transit 1	8230		8230	Utica	cuttings	1.39	0.37	0.21	0.15	356.00	*	-1.00		15.00	11.00	1.40	27.00	0.64	lc	f
06-3541-137722	31009092350000	Enterprise St Transit 1	8240		8240	Utica	cuttings	1.46	0.39	0.21	0.15	376.00	*	-1.00		14.00	10.00	1.40	27.00	0.65		f
06-3541-137723	31009092350000	Enterprise St Transit 1	8260		8260	Utica	cuttings	1.54	0.45	0.19	0.15	312.00	*	-1.00		12.00	10.00	1.27	29.00	0.70	c	f
06-3541-137724	31009092350000	Enterprise St Transit 1	8270		8270	Utica	cuttings	1.57	0.46	0.27	0.14	365.00	*	-1.00		17.00	9.00	1.93	29.00	0.63		f
06-3541-137725	31009092350000	Enterprise St Transit 1	8280		8280	Utica	cuttings	0.99	0.34	0.19	0.14	359.00	*	-1.00		19.00	14.00	1.36	34.00	0.64	lc	f
06-3541-137726	31009092350000	Enterprise St Transit 1	8310		8310	Utica	cuttings	0.85	0.25	0.10	0.13	312.00	*	-1.00		12.00	15.00	0.77	29.00	0.71		f
06-3541-137727	31009092350000	Enterprise St Transit 1	8330		8330	Utica	cuttings	0.82	0.26	0.08	0.13	-1.00	*	-1.00		10.00	16.00	0.62	32.00	0.76		f
06-3541-137728	31009092350000	Enterprise St Transit 1	8350		8350	Utica	cuttings	0.63	0.19	0.10	0.11	312.00	*	-1.00		16.00	17.00	0.91	30.00	0.66		f
06-3541-137729	31009092350000	Enterprise St Transit 1	8400		8400	Utica	cuttings	0.65	0.19	0.12	0.12	312.00	*	-1.00		18.00	18.00	1.00	29.00	0.61		f
06-3541-137744	31101230850000	Erwin WMA1	8960		8960	Utica	cuttings	1.03	0.22	0.03	0.06	394.00	*	-1.00		3.00	6.00	0.50	21.00	0.88	lc	f
06-3541-137745	31101230850000	Erwin WMA1	9000		9000	Utica	cuttings	0.80	0.16	0.05	0.05	357.00	*	-1.00		6.00	6.00	1.00	20.00	0.76		f
06-3541-137746	31101230850000	Erwin WMA1	9080		9080	Utica	cuttings	0.73	0.30	0.19	0.23	367.00	*	-1.00		26.00	32.00	0.83	41.00	0.61		f
06-3541-137750	31015232280000	Little 1	8500		8500	Utica	cuttings	0.72	0.10	0.00	0.11	-1.00	*	-1.00		0.00	15.00	0.00	14.00	1.00		f
06-3541-137751	31015232280000	Little 1	8580		8580	Utica	cuttings	2.09	0.27	0.06	0.10	-1.00	*	-1.00		3.00	5.00	0.60	13.00	0.82	lc	f
06-3541-137752	31015232280000	Little 1	8650		8650	Utica	cuttings	1.47	0.27	0.04	0.10	312.00	*	-1.00		3.00	7.00	0.40	18.00	0.87		f
06-3541-137768	31101229780000	Ballymoney 1	9940		9940	Utica	cuttings	0.80	0.38	0.23	0.30	355.00	*	-1.00		29.00	38.00	0.77	47.00	0.62		lts2p
06-3541-137769	31101229780000	Ballymoney 1	9950		9950	Utica	cuttings	0.73	0.34	0.19	0.23	357.00	*	-1.00		26.00	32.00	0.83	47.00	0.64		lts2p
06-3541-137770	31101229780000	Ballymoney 1	9960		9960	Utica	cuttings	1.49	0.76	0.38	0.46	349.00	*	-1.00		26.00	31.00	0.83	51.00	0.67		lts2p
06-3541-137771	31101229780000	Ballymoney 1	9970		9970	Utica	cuttings	1.51	0.61	0.29	0.43	350.00	*	-1.00		19.00	28.00	0.67	40.00	0.68		lts2p
06-3541-137772	31101229780000	Ballymoney 1	9980		9980	Utica	cuttings	2.10	0.73	0.51	0.56	351.00		-1.00		24.00	27.00	0.91	35.00	0.59		lts2p
06-3541-137773	31101229780000	Ballymoney 1	9990		9990	Utica	cuttings	2.08	0.86	0.48	0.62	349.00	*	-1.00		23.00	30.00	0.77	41.00	0.64		lts2p
06-3541-137774	31101229780000	Ballymoney 1	10000		10000	Utica	cuttings	1.52	0.86	0.47	0.50	354.00	*	-1.00		31.00	33.00	0.94	57.00	0.65	c, lc	lts2p
06-3593-139599	31007050870000	Richards 1	7450		7450	Utica	cuttings	1.00	0.10	0.08	0.13	368.00	*	-1.00		8.00	13.00	0.62	10.00	0.56		f
06-3593-139600	31007050870000	Richards 1	7480		7480	Utica	cuttings	1.27	0.11	0.18	0.19	501.00	*	1.86		14.00	15.00	0.95	9.00	0.38		f
06-3593-139601	31007050870000	Richards 1	7510		7510	Utica	cuttings	0.89	0.20	0.17	0.11	351.00	*	-1.00		19.00	12.00	1.55	22.00	0.54		f
06-3593-139602	31009085810000	Thomasett 1	4630		4630	Utica	cuttings	0.87	0.45	1.16	0.20	403.00		0.09		133.00	23.00	5.80	52.00	0.28		n
06-3593-139603	31009085810000	Thomasett 1	4660		4660	Utica	cuttings	0.52	0.09	0.12	0.11	414.00	*	0.29		23.00	21.00	1.09	17.00	0.43		f
06-3593-139604	31009085810000	Thomasett 1	4690		4690	Utica	cuttings	0.40	0.19	0.21	0.16	413.00	*	0.27		52.00	40.00	1.31	47.00	0.48		f
06-3593-139617	31109044670000	Fee Richardson 1	7140	7150	7145	Utica	cuttings	0.97	0.56	0.36	0.16	378.00	*	-1.00		37.00	16.00	2.25	58.00	0.61	c	f
06-3593-139618	31109044670000	Fee Richardson 1	7160	7170	7165	Utica	cuttings	1.21	0.43	0.39	0.13	428.00	*	0.54		32.00	11.00	3.00	36.00	0.52	c	f
06-3593-139619	31109044670000	Fee Richardson 1	7180	7190	7185	Utica	cuttings	1.04	0.41	0.31	0.17	424.00	*	0.47		30.00	16.00	1.82	39.00	0.57	lc	f
06-3593-139620	31109044670000	Fee Richardson 1	7200	7210	7205	Utica	cuttings	0.97	0.34	0.51	0.20	389.00		-1.00		53.00	21.00	2.55	35.00	0.40		f
06-3593-139621	31109044670000	Fee Richardson 1	7220	7230	7225	Utica	cuttings	0.88	0.39	0.48	0.13	379.00	*	-1.00		55.00	15.00	3.69	44.00	0.45		f
06-3593-139622	31109044670000	Fee Richardson 1	7240	7250	7245	Utica	cuttings	0.98	0.34	0.39	0.13	469.00	*	1.28		40.00	13.00	3.00	35.00	0.47		f
06-3593-139623	31109044670000	Fee Richardson 1	7260	7270	7265	Utica	cuttings	1.07	0.42	0.21	0.22	425.00	*	0.49		20.00	21.00	0.95	39.00	0.67		f
06-3593-139624	31109044670000	Fee Richardson 1	7280	7290	7285	Utica	cuttings	1.21	0.49	0.33	0.17	421.00	*	0.42		27.00	14.00	1.94	40.00	0.60		f
06-3593-139625	31109044670000	Fee Richardson 1	7300	7310	7305	Utica	cuttings	0.94	0.36	0.53	0.15	409.00	*	0.20		56.00	16.00	3.53	38.00	0.40		f
06-3593-139626	31109044670000	Fee Richardson 1	7320	7330	7325	Utica	cuttings	0.92	0.34	0.38	0.16	390.00	*	-1.00		41.00	17.00	2.38	37.00	0.47		f
06-3593-139627	31109044670000	Fee Richardson 1	7340	7350	7345	Utica	cuttings	1.04	0.34	0.39	0.32	381.00	*	-1.00		38.00	31.00	1.22	33.00	0.47		f
06-3593-139628	31109044670000	Fee Richardson 1	7350	7360	7355	Utica	cuttings	0.72	0.30	0.15	0.24	389.00	*	-1.00		21.00	33.00	0.63	42.00	0.67	c	f
06-3593-139632	31013044370000	Harrington 1	5200	5210	5205	Utica	cuttings	0.19	0.22	0.25	0.19	401.00	*	0.06		132.00	100.00	1.32	116.00	0.47	lc	f
06-3593-139633	31013044370000	Harrington 1	5250	5260	5255	Utica	cuttings	0.24	0.10	0.16	0.15	414.00	*	0.29		67.00	63.00	1.07	42.00	0.38		f
06-3593-139634	31013044370000	Harrington 1	5300	5310	5305	Utica	cuttings	0.21	0.18	0.20	0.16	361.00	*	-1.00		95.00	76.00	1.25	86.00	0.47		f
06-3593-139635	31013044370000	Harrington 1	5350	5360	5355	Utica	cuttings	0.24	0.26	0.23	0.19	351.00	*	-1.00		96.00	79.00	1.21	108.00	0.53		f
06-3593-139636	31013044370000	Harrington 1	5400	5410	5405	Utica	cuttings	0.25	0.16	0.19	0.16	422.00	*	0.44		76.00	64.00	1.19	64.00	0.46		f
06-3593-139637	31013044370000	Harrington 1	5440	5450	5445	Utica	cuttings	0.25	0.12	0.17	0.22	422.00	*	0.44		68.00	88.00	0.77	48.00	0.41	c	f
06-3593-139638	31013044370000	Harrington 1	5500	5510	5505	Utica	cuttings	0.27	0.10	0.15	0.15	375.00	*	-1.00		56.00	56.00	1.00	37.00	0.40	c, lc	f
06-3593-139639	31013044370000	Harrington 1	5550	5560	5555	Utica	cuttings	0.26	0.10	0.15	0.16	388.00	*	-1.00		58.00	62.00	0.94	38.00	0.40		f
06-3593-139640	31013044370000	Harrington 1	5600	5610	5605	Utica	cuttings	0.31	0.19	0.25	0.13	444.00	*	0.83		81.00	42.00	1.92	61.00	0.43		f
06-3593-139641	31013044370000	Harrington 1	5650	5660	5655	Utica	cuttings	0.38	0.14	0.32	0.09	475.00	*	1.39		84.00	24.00	3.56	37.00	0.30		f
06-3593-139642	31013044370000	Harrington 1	5700	5710	5705	Utica	cuttings	0.39	0.21	0.28	0.13	465.00	*	1.21		72.00	33.00	2.15	54.00	0.43		f
06-3593-139643	31013044370000	Harrington 1	5750	5760	5755	Utica	cuttings	0.41	0.15	0.23	0.13	449.00	*	0.92		56.00	32.00	1.77	37.00	0.39		f
06-3593-139644	31013044370000	Harrington 1	5800	5810	5805	Utica	cuttings	0.62	0.65	0.59	0.26	377.00		-1.00		95.00	42.00	2.27	105.00	0.52	lc	lts2p
06-3593-139645	31013044370000	Harrington 1	5850	5860	5855	Utica	cuttings	0.56	0.59	0.52	0.20	357.00		-1.00		93.00	36.00	2.60	105.00	0.53		lts2p
06-3593-139646	31013044370000	Harrington 1	5900	5910	5905	Utica	cuttings	0.48	0.32	0.38	0.13	436.00	*	0.69		79.00	27.00	2.92	67.00	0.46		f
06-3593-139647	31013044370000	Harrington 1	5950	5960	5955	Utica	cuttings	0.73	0.80	0.82	0.26	355.00		-1.00		112.00	36.00	3.15	110.00	0.49		lts2p
06-3593-139661	31025042140000	Campbell HA & MW 1	7640	7650	7645	Utica	cuttings	1.11	0.51	0.26	0.15	354.00	*	-1.00		23.00	14.00	1.73	46.00	0.66		lts2p
06-3593-139662	31025042140000	Campbell HA & MW 1	7700	7710	7705	Utica	cuttings	1.01	0.42	0.19	0.10	356.00	*	-1.00		19.00	10.00	1.90	42.00	0.69		f
06-3593-139663	31025042140000	Campbell HA & MW 1	7750	7760	7755	Utica	cuttings	1.27	0.40	0.16	0.15	354.00	*	-1.00		13.00	12.00	1.07	31.00	0.71		lts2p
06-3593-139664	31025042140000	Campbell HA & MW 1	7780	7790	7785	Utica	cuttings	1.44	0.51	0.20	0.16	355.00	*	-1.00		14.00	11.00	1.25	35.00	0.72		lts2p
06-3593-139665	31025042140000	Campbell HA & MW 1	7800	7810	7805	Utica	cuttings	1.29	0.30	0.11	0.15	311.00	*	-1.00		9.00	12.00	0.73	23.00	0.73		f
06-3593-139666	31025042140000	Campbell HA & MW 1	7850	7860	7855	Utica	cuttings	1.64	0.56	0.08	0.10	311.00	*	-1.00		5.00	6.00	0.80	34.00	0.88	lc	f
06-3593-139667	31025042140000	Campbell HA & MW 1	7900	7910	7905	Utica	cuttings	1.56	0.54	0.15	0.18	361.00	*	-1.00		10.00	12.00	0.83	35.00	0.78		f
06-3593-139668	31025042140000	Campbell HA & MW 1	7950	7960	7955	Utica	cuttings	2.07	0.55	0.21	0.15	359.00	*	-1.00		10.00	7.00	1.40	27.00	0.72	c	lts2p
06-3593-139669	31025042140000	Campbell HA & MW 1	8000	8010	8005	Utica	cuttings	1.53	0.49	0.17	0.13	357.00	*	-1.00		11.00	8.00	1.31	32.00	0.74		lts2p
06-3593-139670	31025042140000	Campbell HA & MW 1	8050	8060	8055	Utica	cuttings	1.80	0.71	0.25	0.16	358.00	*	-1.00		14.00	9.00	1.56	39.00	0.74		lts2p
06-3593-139671	31025042140000	Campbell HA & MW 1	8100	8110	8105	Utica	cuttings	2.15	0.72	0.25	0.17	354.00	*	-1.00		12.00	8.00	1.47	33.00	0.74	lc	lts2p
06-3593-139672	31025042140000	Campbell HA & MW 1	8150	8160	8155	Utica	cuttings	2.85	0.94	0.33	0.18	358.00	*	-1.00		12.00	6.00	1.83	33.00	0.74		lts2p
06-3593-139673	31025042140000	Campbell HA & MW 1	8220		8220	Utica	cuttings	2.26	1.06	0.45	0.26	358.00	*	-1.00		20.00	12.00	1.73	47.00	0.70		lts2p

Humble Geochemical Services Division

HGS No.	API Number	Well Name	Top Depth (ft.)	Bottom Depth (ft.)	Median Depth (ft.)	Formation Name	Sample Type	Leco TOC		S1	S2	S3	Tmax (°C)		Calc. %Ro	Meas. %Ro	HI	OI	S2/S3	S1/TOC	PI	Notes Checks	Pyrogram
06-3593-139677	31013041540000	Shadle S 1	5150		5150	Utica	cuttings	0.62		0.34	0.36	0.11	487.00	*	1.61		58.00	18.00	3.27	55.00	0.49	c, Ic	f
06-3593-139678	31013041540000	Shadle S 1	5170	5180	5175	Utica	cuttings	0.47		0.29	0.23	0.13	418.00	*	0.36		49.00	28.00	1.77	62.00	0.56	c	f
06-3593-139679	31013041540000	Shadle S 1	5190	5200	5195	Utica	cuttings	0.40		0.27	0.23	0.12	436.00	*	0.69		58.00	30.00	1.92	68.00	0.54		f
06-3593-139680	31013041540000	Shadle S 1	5210	5220	5215	Utica	cuttings	0.49		0.62	0.47	0.18	351.00	*	-1.00		96.00	37.00	2.61	127.00	0.57		lts2p
06-3593-139681	31013041540000	Shadle S 1	5230	5240	5235	Utica	cuttings	0.62		1.47	0.56	0.32	378.00		-1.00		90.00	52.00	1.75	237.00	0.72		lts2p
06-3593-139682	31013041540000	Shadle S 1	5250	5260	5255	Utica	cuttings	0.48		0.77	0.33	0.25	359.00	*	-1.00		69.00	52.00	1.32	160.00	0.70	Ic	f
06-3593-139683	31013041540000	Shadle S 1	5270	5280	5275	Utica	cuttings	0.52		0.77	0.38	0.17	362.00	*	-1.00		73.00	33.00	2.24	148.00	0.67		f
06-3593-139684	31013041540000	Shadle S 1	5290	5300	5295	Utica	cuttings	0.55		0.77	0.28	0.28	398.00	*	-1.00		51.00	51.00	1.00	140.00	0.73		f
06-3593-139685	31013041540000	Shadle S 1	5310	5315	5312.5	Utica	cuttings	0.39		0.27	0.17	0.16	421.00	*	0.42		44.00	41.00	1.06	69.00	0.61		f
06-3593-139686	31013041540000	Shadle S 1	5330	5335	5332.5	Utica	cuttings	0.98		2.67	1.74	0.42	365.00		-1.00		178.00	43.00	4.14	272.00	0.61		lts2p
06-3593-139687	31013041540000	Shadle S 1	5350	5355	5352.5	Utica	cuttings	0.60		0.29	0.35	0.11	518.00	*	2.16		58.00	18.00	3.18	48.00	0.45		f
06-3593-139688	31013041540000	Shadle S 1	5370	5375	5372.5	Utica	cuttings	0.46		0.34	0.38	0.11	428.00	*	0.54		83.00	24.00	3.45	74.00	0.47	c, Ic	f
06-3593-139689	31013041540000	Shadle S 1	5390	5395	5392.5	Utica	cuttings	0.66		0.26	0.29	0.09	495.00	*	1.75		44.00	14.00	3.22	39.00	0.47		f
06-3593-139690	31013041540000	Shadle S 1	5410	5415	5412.5	Utica	cuttings	0.65		0.32	0.39	0.09	499.00	*	1.82		60.00	14.00	4.33	49.00	0.45		f
06-3593-139691	31013041540000	Shadle S 1	5425	5430	5427.5	Utica	cuttings	0.79		0.42	0.56	0.12	365.00		-1.00		71.00	15.00	4.67	53.00	0.43		f
06-3593-139700	31010904130000	Grund GH 1	7090	7100	7095	Utica	cuttings	0.77		0.45	0.28	0.22	360.00	*	-1.00		36.00	29.00	1.27	58.00	0.62		f
06-3593-139701	31010904130000	Grund GH 1	7110	7120	7115	Utica	cuttings	0.78		0.42	0.26	0.25	481.00	*	1.50		33.00	32.00	1.04	54.00	0.62		f
06-3593-139702	31010904130000	Grund GH 1	7130	7140	7135	Utica	cuttings	0.87		0.39	0.24	0.23	493.00	*	1.71		28.00	26.00	1.04	45.00	0.62		f
06-3593-139703	31010904130000	Grund GH 1	7150	7160	7155	Utica	cuttings	1.01		0.39	0.22	0.21	491.00	*	1.68		22.00	21.00	1.05	39.00	0.64		f
06-3593-139704	31010904130000	Grund GH 1	7170	7180	7175	Utica	cuttings	0.84		0.30	0.21	0.19	433.00	*	0.63		25.00	23.00	1.11	36.00	0.59		f
06-3593-139705	31010904130000	Grund GH 1	7190	7200	7195	Utica	cuttings	0.76		0.36	0.30	0.16	455.00	*	1.03		39.00	21.00	1.88	47.00	0.55		f
06-3593-139706	31010904130000	Grund GH 1	7210	7220	7215	Utica	cuttings	0.74		0.41	0.25	0.20	369.00	*	-1.00		34.00	27.00	1.25	55.00	0.62		f
06-3593-139707	31010904130000	Grund GH 1	7230	7240	7235	Utica	cuttings	0.64		0.38	0.25	0.27	386.00	*	-1.00		39.00	42.00	0.93	59.00	0.60	Ic	f
06-3593-139708	31010904130000	Grund GH 1	7250	7260	7255	Utica	cuttings	0.60		0.26	0.18	0.21	356.00	*	-1.00		30.00	35.00	0.86	43.00	0.59	c	f
06-3593-139709	31010904130000	Grund GH 1	7270	7280	7275	Utica	cuttings	0.64		0.31	0.22	0.22	450.00	*	0.94		34.00	34.00	1.00	48.00	0.58		f
06-3593-139722	31053194850000	Larkin 1	3680		3680	Utica	cuttings	0.67		0.16	0.13	0.21	354.00	*	-1.00		19.00	31.00	0.62	24.00	0.55		f
06-3593-139723	31053194850000	Larkin 1	3700		3700	Utica	cuttings	0.55		0.44	0.20	0.08	353.00	*	-1.00		36.00	15.00	2.50	80.00	0.69		f
06-3593-139724	31053194850000	Larkin 1	3720		3720	Utica	cuttings	0.70		0.39	0.24	0.13	360.00	*	-1.00		34.00	19.00	1.85	56.00	0.62		lts2p
06-3593-139725	31053194850000	Larkin 1	3740		3740	Utica	cuttings	0.82		0.50	0.28	0.16	343.00	*	-1.00		34.00	20.00	1.75	61.00	0.64		f
06-3593-139726	31053194850000	Larkin 1	3760		3760	Utica	cuttings	1.56		0.38	0.21	0.13	351.00	*	-1.00		13.00	8.00	1.62	24.00	0.64	Ic	f
06-3593-139727	31053194850000	Larkin 1	3780		3780	Utica	cuttings	1.49		0.82	0.41	0.25	349.00	*	-1.00		28.00	17.00	1.64	55.00	0.67		lts2p
06-3593-139728	31053194850000	Larkin 1	3800		3800	Utica	cuttings	1.21		0.65	0.30	0.18	349.00	*	-1.00		25.00	15.00	1.67	54.00	0.68	c	lts2p
06-3593-139729	31053194850000	Larkin 1	3820		3820	Utica	cuttings	1.76		1.17	0.71	0.34	360.00		-1.00		40.00	19.00	2.09	66.00	0.62		lts2p
06-3593-139730	31053194850000	Larkin 1	3840		3840	Utica	cuttings	1.98		0.37	0.20	0.14	348.00	*	-1.00		10.00	7.00	1.43	19.00	0.65		lts2p
06-3593-139731	31053194850000	Larkin 1	3860		3860	Utica	cuttings	2.11		0.75	0.37	0.25	351.00	*	-1.00		18.00	12.00	1.48	36.00	0.67	Ic	lts2p
06-3593-139732	31053194850000	Larkin 1	3880		3880	Utica	cuttings	2.61		1.17	0.78	0.28	355.00		-1.00		30.00	11.00	2.79	45.00	0.60		lts2p
06-3593-139733	31053194850000	Larkin 1	3900		3900	Utica	cuttings	2.33		0.78	0.53	0.25	352.00		-1.00		23.00	11.00	2.12	33.00	0.60		lts2p
06-3593-139734	31053194850000	Larkin 1	3920		3920	Utica	cuttings	2.62		0.42	0.61	0.19	362.00		-1.00		23.00	7.00	3.21	16.00	0.41		lts2p
06-3593-139735	31053194850000	Larkin 1	3940		3940	Utica	cuttings	2.16		0.21	0.15	0.37	419.00	*	0.38		7.00	17.00	0.41	10.00	0.58		f
06-3593-139736	31053194850000	Larkin 1	3960		3960	Utica	cuttings	2.34		0.50	0.38	0.19	352.00	*	-1.00		16.00	8.00	2.00	21.00	0.57		lts2p
06-3593-139737	31053194850000	Larkin 1	3980		3980	Utica	cuttings	2.13		0.71	0.38	0.23	355.00	*	-1.00		18.00	11.00	1.65	33.00	0.65	c	lts2p
06-3593-139738	31053194850000	Larkin 1	4000		4000	Utica	cuttings	2.18		0.50	0.22	0.38	355.00	*	-1.00		10.00	17.00	0.58	23.00	0.69	c	f
06-3593-139739	31053194850000	Larkin 1	4020		4020	Utica	cuttings	1.80		0.95	0.44	0.24	356.00	*	-1.00		24.00	13.00	1.83	53.00	0.68	Ic	lts2p
06-3593-139740	31075042090000	Heaphy 1	1000		1000	Utica	cuttings	0.36		0.24	0.13	0.09	426.00	*	0.51		36.00	25.00	1.44	67.00	0.65		f
06-3593-139741	31075042090000	Heaphy 1	1050		1050	Utica	cuttings	0.38		0.07	0.08	0.10	445.00	*	0.85		21.00	26.00	0.80	18.00	0.47		f
06-3593-139742	31075042090000	Heaphy 1	1100		1100	Utica	cuttings	0.32		0.09	0.08	0.09	423.00	*	0.45		25.00	28.00	0.89	28.00	0.53		f
06-3593-139743	31075042090000	Heaphy 1	1150		1150	Utica	cuttings	0.41		0.10	0.06	0.07	374.00	*	-1.00		15.00	17.00	0.86	24.00	0.62		f
06-3593-139744	31075042090000	Heaphy 1	1200		1200	Utica	cuttings	0.34		0.07	0.07	0.07	343.00	*	-1.00		21.00	21.00	1.00	21.00	0.50		f
06-3593-139745	31075042090000	Heaphy 1	1250		1250	Utica	cuttings	0.42		0.14	0.17	0.07	370.00	*	-1.00		40.00	17.00	2.43	33.00	0.45		f
06-3593-139746	31075042090000	Heaphy 1	1300		1300	Utica	cuttings	0.46		0.14	0.10	0.09	366.00	*	-1.00		22.00	20.00	1.11	30.00	0.58		f
06-3593-139747	31075042090000	Heaphy 1	1350		1350	Utica	cuttings	0.47		0.13	0.07	0.11	425.00	*	0.49		15.00	23.00	0.64	28.00	0.65		f
06-3593-139748	31075042090000	Heaphy 1	1400		1400	Utica	cuttings	0.59		0.14	0.11	0.08	374.00	*	-1.00		19.00	14.00	1.38	24.00	0.56	c	f
06-3593-139749	31075042090000	Heaphy 1	1530		1530	Utica	cuttings	1.14		0.37	0.18	0.10	358.00	*	-1.00		16.00	9.00	1.80	32.00	0.67		f
06-3593-139750	31075042090000	Heaphy 1	1570		1570	Utica	cuttings	1.22		0.43	0.23	0.13	352.00	*	-1.00		19.00	11.00	1.77	35.00	0.65	Ic	f
06-3593-139751	31075042090000	Heaphy 1	1600		1600	Utica	cuttings	1.21		0.35	0.20	0.09	353.00	*	-1.00		17.00	7.00	2.22	29.00	0.64		f
06-3593-139752	31075042010000	Fee 1	400		400	Utica	cuttings	1.40		0.47	0.33	0.10	475.00	*	1.39		24.00	7.00	3.30	34.00	0.59		f
06-3593-139753	31075042010000	Fee 1	450		450	Utica	cuttings	1.48		0.44	0.30	0.12	475.00	*	1.39		20.00	8.00	2.50	30.00	0.59		f
06-3593-139754	31013113870000	Emling 373	5120		5120	Utica	cuttings	0.60		0.16	0.25	0.23	404.00	*	0.11		42.00	38.00	1.09	27.00	0.39		f
06-3593-139755	31013113870000	Emling 373	5140		5140	Utica	cuttings	0.58		0.25	0.33	0.26	427.00	*	0.53		57.00	45.00	1.27	43.00	0.43		f
06-3593-139756	31013113870000	Emling 373	5160		5160	Utica	cuttings	0.61		0.39	0.43	0.56	406.00	*	0.15		70.00	92.00	0.77	64.00	0.48	Ic	f
06-3593-139757	31013113870000	Emling 373	5180		5180	Utica	cuttings	0.79		0.38	0.57	0.42	433.00		0.63		72.00	53.00	1.36	48.00	0.40	c	f
06-3593-139758	31013113870000	Emling 373	5200		5200	Utica	cuttings	1.25		0.63	0.67	0.28	445.00		0.85		54.00	22.00	2.39	50.00	0.48	c	n;lts2sh
06-3593-139759	31013113870000	Emling 373	5220		5220	Utica	cuttings	0.62		0.22	0.37	0.51	411.00	*	0.24		60.00	82.00	0.73	35.00	0.37		f
06-3593-139760	31013113870000	Emling 373	5240		5240	Utica	cuttings	0.70		0.40	0.47	0.30	401.00	*	0.06		67.00	43.00	1.57	57.00	0.46		f
06-3593-139761	31013113870000	Emling 373	5260		5260	Utica	cuttings	0.68		0.30	0.33	0.28	420.00	*	0.40		49.00	41.00	1.18	44.00	0.48		f
06-3593-139762	31013113870000	Emling 373	5280		5280	Utica	cuttings	0.72		0.32	0.44	0.25	405.00	*	0.13		61.00	35.00	1.76	44.00	0.42	Ic	f
06-3593-139763	31013113870000	Emling 373	5300		5300	Utica	cuttings	0.75		0.39	0.53	0.35	405.00		0.13		71.00	47.00	1.51	52.00	0.42	Ic	f
06-3593-139764	31013113870000	Emling 373	5320		5320	Utica	cuttings	0.84		0.35	0.41	0.45	428.00	*	0.54		49.00	54.00	0.91	42.00	0.46		f
06-3593-139773	31025215000000	NYS REF 6 Well 01	5700		5700	Utica	cuttings	0.40		0.12	0.07	0.15	465.00	*	1.21		17.00	38.00	0.47	30.00	0.63		f
06-3593-139774	31025215000000	NYS REF 6 Well 01	5800		5800	Utica	cuttings	0.46		0.11	0.07	0.08	339.00	*	-1.00		15.00	17.00	0.88	24.00	0.61	Ic	f
06-3593-139775	31025215000000	NYS REF 6 Well 01	5900		5900	Utica	cuttings	1.29		0.35	0.11	0.15	382.00	*	-1.00		9.00	12.00	0.73	27.00	0.76		f
06-3593-139776	31025215000000	NYS REF 6 Well 01	5920		5920	Utica	cuttings	1.37		0.25	0.13	0.16	350.00	*	-1.00		9.00	12.00	0.81	18.00	0.66		f
06-3593-139777	31025215000000	NYS REF 6 Well 01	5940		5940	Utica	cuttings	1.42		0.32	0.07	0.13	400.00	*	-1.00		5.00	9.00	0.54	23.00	0.82	c	f
06-3593-139778	31025215000000	NYS REF 6 Well 01	5960		5960	Utica	cuttings	1.46		0.35	0.29	0.15	374.00	*	-1.00		20.00	10.00	1.93	24.00	0.55	c	f
06-3593-139779	31025215000000	NYS REF 6 Well 01	5980		5980	Utica	cuttings	1.38		0.22	0.12	0.19	378.00	*	-1.00		9.00	14.00	0.63	16.00	0.65		f
06-3593-139780	31025215000000	NYS REF 6 Well 01	6000		6000	Utica	cuttings	1.46		0.32	0.13	0.19	311.00	*	-1.00		9.00	13.00	0.68	22.00	0.71		f
06-3593-139781	31025215000000	NYS REF 6 Well 01	6020		6020	Utica	cuttings	1.63		0.24	0.11	0.21	311.00	*	-1.00		7.00	13.00	0.52	15.00	0.69	Ic	f
06-3593-139782	31025215000000	NYS REF 6 Well 01	6040		6040	Utica	cuttings	1.64		0.18	0.12	0.33	349.00	*	-1.00		7.00	20.00	0.36	11.00	0.60		f
06-3593-139783	31025215000000	NYS REF 6 Well 01	6060		6060	Utica	cuttings	1.98		0.73	0.41	0.35	359.00	*	-1.00		21.00	18.00	1.17	37.00	0.64		lts2p
06-3593-139784	31025215000000	NYS REF 6 Well 01	6080		6080	Utica	cuttings	2.16		0.55	0.24	0.27	358.00	*	-1.00		11.00	12.00	0.89	25.00	0.70		f
06-3593-139785	31025215000000	NYS REF 6 Well 01	6100		6100	Utica	cuttings	2.10		0.54	0.22	0.24	355.00	*	-1.00		10.00	11.00	0.92	26.00	0.71		f
06-3593-139786	31025215000000	NYS REF 6 Well 01	6120		6120	Utica	cuttings	2.54		0.66	0.35	0.30	353.00	*	-1.00		14.00	12.00	1.17	26.00	0.65		f
06-3593-139787	31025215000000	NYS REF 6 Well 01	6140		6140	Utica	cuttings	2.23		0.61	0.24	0.28	357.00	*	-1.00		11.00	13.00	0.86	27.00	0.72		f
06-3593-139788	31025215000000	NYS REF 6 Well 01	6170		6170	Utica	cuttings	2.05		0.49	0.14	0.22	349.00	*	-1.00		7.00	11.00	0.64	24.00	0.78		f
06-3593-139789	31025215000000	NYS REF 6 Well 01	6200		6200	Utica	cuttings	0.68		0.22	0.08	0.12	349.00	*	-1.00		12.00	18.00	0.67	32.00	0.73		f
06-3593-139790	31025215000000	NYS REF 6 Well 01	6250		6250	Utica	cuttings	0.92		0.32	0.13	0.15	359.00	*	-1.00		14.00	16.00	0.87	35.00	0.71	c	f
06-3593-139791	31025215000000	NYS REF 6 Well 01	6270		6270	Utica	cuttings	0.80		0.14	0.06	0.17	361.00	*	-1.00		7.00	21.00	0.35	17.00	0.70		f

Humble Geochemical Services Division

HGS No.	API Number	Well Name	Top Depth (ft.)	Bottom Depth (ft.)	Median Depth (ft.)	Formation Name	Sample Type	Leco TOC		S1	S2	S3	Tmax (°C)		Calc. %Ro	Meas. %Ro	HI	OI	S2/S3	S1/TOC	PI	Notes Checks	Pyrogram
06-3684-146848	31023047140000	Clough K&O 1	6730		6730	Utica	cuttings	1.04		0.28	0.11	0.16	311.00		-1.00		11.00	15.00	0.69	27.00	0.72		f
06-3684-146849	31023047140000	Clough K&O 1	6780		6780	Utica	cuttings	1.49		0.52	0.11	0.18	-1.00	*	-1.00		7.00	12.00	0.61	35.00	0.83		f
06-3684-146850	31023047140000	Clough K&O 1	6820		6820	Utica	cuttings	2.30		0.46	0.11	0.20	-1.00	*	-1.00		5.00	9.00	0.55	20.00	0.81		f
06-3684-146851	31023047140000	Clough K&O 1	6850		6850	Utica	cuttings	2.49		0.43	0.07	0.17	311.00	*	-1.00		3.00	7.00	0.41	17.00	0.86		f
06-3684-146852	31023047140000	Clough K&O 1	6880		6880	Utica	cuttings	3.06		0.59	0.17	0.27	362.00	*	-1.00		6.00	9.00	0.63	19.00	0.78		f
06-3684-146853	31023047140000	Clough K&O 1	6900		6900	Utica	cuttings	2.43		0.67	0.21	0.21	364.00	*	-1.00		9.00	9.00	1.00	28.00	0.76	c	f
06-3981-157584	31043040340000	Puskarenko 1	983	996	989.5	Utica	cuttings	0.67		0.24	0.28	0.20	386.00	*	-1.00		42.00	30.00	1.40	36.00	0.46	c, lc	f
06-3981-157585	31043040340000	Puskarenko 1	996	1009	1002.5	Utica	cuttings	0.64		0.27	0.24	0.20	415.00	*	0.31		38.00	31.00	1.20	42.00	0.53		f
06-3981-157586	31043040340000	Puskarenko 1	1009	1020	1014.5	Utica	cuttings	0.87		0.32	0.15	0.19	315.00	*	-1.00		17.00	22.00	0.79	37.00	0.68		f
06-3981-157587	31043040340000	Puskarenko 1	1020	1033	1026.5	Utica	cuttings	0.66		0.28	0.20	0.24	315.00	*	-1.00		30.00	36.00	0.83	42.00	0.58		f
06-3981-157588	31043040340000	Puskarenko 1	1033	1044	1038.5	Utica	cuttings	0.55		0.21	0.15	0.23	335.00	*	-1.00		27.00	42.00	0.65	38.00	0.58		f
06-3981-157589	31043040340000	Puskarenko 1	1044	1057	1050.5	Utica	cuttings	0.50		0.21	0.15	0.24	315.00	*	-1.00		30.00	48.00	0.63	42.00	0.58		f
06-3981-157590	31043040340000	Puskarenko 1	1057	1069	1063	Utica	cuttings	1.32		0.43	0.26	0.21	315.00	*	-1.00		20.00	16.00	1.24	33.00	0.62	lc	f
06-3981-157591	31043040340000	Puskarenko 1	1069	1081	1075	Utica	cuttings	0.83		0.30	0.22	0.20	315.00	*	-1.00		27.00	24.00	1.10	36.00	0.58		f
06-3981-157592	31043040340000	Puskarenko 1	1081	1094	1087.5	Utica	cuttings	0.76		0.27	0.24	0.19	315.00	*	-1.00		32.00	25.00	1.26	36.00	0.53		f
06-3981-157593	31043040340000	Puskarenko 1	1094	1104	1099	Utica	cuttings	0.82		0.27	0.20	0.21	352.00	*	-1.00		24.00	26.00	0.95	33.00	0.57		f
06-3981-157594	31043040340000	Puskarenko 1	1104	1116	1110	Utica	cuttings	1.21		0.33	0.21	0.23	333.00	*	-1.00		17.00	19.00	0.91	27.00	0.61	c	f
06-3981-157595	31043040340000	Puskarenko 1	1116	1126	1121	Utica	cuttings	1.72		0.50	0.35	0.27	379.00	*	-1.00		20.00	16.00	1.30	29.00	0.59		f
06-3981-157596	31043040340000	Puskarenko 1	1126	1140	1133	Utica	cuttings	1.81		0.51	0.34	0.23	352.00	*	-1.00		19.00	13.00	1.48	28.00	0.60	lc	f
06-3981-157597	31043040340000	Puskarenko 1	1140	1154	1147	Utica	cuttings	1.70		0.54	0.29	0.28	381.00	*	-1.00		17.00	16.00	1.04	32.00	0.65		f
06-3981-157598	31043040340000	Puskarenko 1	1154	1167	1160.5	Utica	cuttings	1.15		0.41	0.25	0.23	339.00	*	-1.00		22.00	20.00	1.09	36.00	0.62		f
06-3981-157599	31043040340000	Puskarenko 1	1167	1179	1173	Utica	cuttings	2.14		0.75	0.41	0.27	405.00	*	0.13		19.00	13.00	1.52	35.00	0.65		f
06-3981-157600	31043040340000	Puskarenko 1	1179	1192	1185.5	Utica	cuttings	2.48		0.70	0.39	0.28	346.00	*	-1.00		16.00	11.00	1.39	28.00	0.64		f
06-3981-157601	31043040340000	Puskarenko 1	1192	1202	1197	Utica	cuttings	2.82		0.91	0.49	0.26	416.00	*	0.33		17.00	9.00	1.88	32.00	0.65	lc	f
06-3981-157602	31043040340000	Puskarenko 1	1202	1215	1208.5	Utica	cuttings	2.89		0.93	0.58	0.27	467.00		1.25		20.00	9.00	2.15	32.00	0.62		f
06-3981-157603	31043040340000	Puskarenko 1	1215	1226	1220.5	Utica	cuttings	2.84		0.98	0.62	0.30	461.00		1.14		22.00	11.00	2.07	35.00	0.61	c	f
06-3981-157604	31043040340000	Puskarenko 1	1226	1239	1232.5	Utica	cuttings	2.62		1.14	0.55	0.28	423.00		0.45		21.00	11.00	1.96	44.00	0.67	c	f
06-3981-157605	31043040340000	Puskarenko 1	1239	1251	1245	Utica	cuttings	2.68		1.05	0.58	0.27	452.00		0.98		22.00	10.00	2.15	39.00	0.64		f
06-3981-157606	31043040340000	Puskarenko 1	1264	1275	1269.5	Utica	cuttings	2.60		0.95	0.62	0.28	425.00		0.49		24.00	11.00	2.21	37.00	0.61		f
06-3981-157607	31043040340000	Puskarenko 1	1276	1288	1282	Utica	cuttings	2.60		1.14	0.68	0.28	412.00		0.26		26.00	11.00	2.43	44.00	0.63	lc	f
06-3981-157608	31043040340000	Puskarenko 1	1288	1300	1294	Utica	cuttings	2.55		1.19	0.77	0.28	401.00		0.06		30.00	11.00	2.75	47.00	0.61		f
06-3981-157609	31043040340000	Puskarenko 1	1300	1311	1305.5	Utica	cuttings	2.40		0.87	0.52	0.30	475.00		1.39		22.00	12.00	1.73	36.00	0.63		f
06-3981-157610	31043040340000	Puskarenko 1	1311	1322	1316.5	Utica	cuttings	2.11		0.75	0.45	0.30	476.00	*	1.41		21.00	14.00	1.50	36.00	0.62		f
06-3981-157611	31043040340000	Puskarenko 1	1322	1333	1327.5	Utica	cuttings	2.28		0.81	0.50	0.27	469.00		1.28		22.00	12.00	1.85	36.00	0.62		f
06-3981-157612	31043040340000	Puskarenko 1	1333	1345	1339	Utica	cuttings	2.38		0.81	0.55	0.27	472.00		1.34		23.00	11.00	2.04	34.00	0.60		f
06-3981-157613	31043040340000	Puskarenko 1	1345	1357	1351	Utica	cuttings	2.43		0.79	0.50	0.28	524.00		2.27		21.00	12.00	1.79	33.00	0.61		f
06-3981-157614	31043040340000	Puskarenko 1	1357	1367	1362	Utica	cuttings	2.56		0.84	0.49	0.21	500.00	*	1.84		19.00	8.00	2.33	33.00	0.63	c	f
06-3981-157615	31043040340000	Puskarenko 1	1367	1381	1374	Utica	cuttings	2.32		0.76	0.56	0.22	471.00		1.32		24.00	9.00	2.55	33.00	0.58	lc	f
06-3981-157616	31043040340000	Puskarenko 1	1381	1393	1387	Utica	cuttings	2.24		0.79	0.54	0.25	444.00		0.83		24.00	11.00	2.16	35.00	0.59		f
06-3981-157617	31043040340000	Puskarenko 1	1393	1404	1398.5	Utica	cuttings	1.83		0.91	0.57	0.29	473.00		1.35		31.00	16.00	1.97	50.00	0.61		f
06-3981-157618	31043040340000	Puskarenko 1	1404	1417	1410.5	Utica	cuttings	2.43		0.70	0.47	0.23	471.00	*	1.32		19.00	9.00	2.04	29.00	0.60		f
06-3981-157619	31043040340000	Puskarenko 1	1417	1430	1423.5	Utica	cuttings	1.99		0.59	0.31	0.31	389.00	*	-1.00		16.00	16.00	1.00	30.00	0.66		f
06-3981-157620	31043040340000	Puskarenko 1	1430	1443	1436.5	Utica	cuttings	2.04		0.68	0.43	0.24	503.00	*	1.89		21.00	12.00	1.79	33.00	0.61		f
06-3981-157621	31043040340000	Puskarenko 1	1443	1454	1448.5	Utica	cuttings	2.16		0.65	0.47	0.37	501.00	*	1.86		22.00	17.00	1.27	30.00	0.58	lc	f
06-3981-157622	31043040340000	Puskarenko 1	1454	1466	1460	Utica	cuttings	1.63		0.55	0.37	0.27	415.00	*	0.31		23.00	17.00	1.37	34.00	0.60		f
06-3981-157623	31043040340000	Puskarenko 1	1466	1477	1471.5	Utica	cuttings	1.83		0.70	0.44	0.23	484.00	*	1.55		24.00	13.00	1.91	38.00	0.61	c	f
06-3981-157624	31043040340000	Puskarenko 1	1477	1488	1482.5	Utica	cuttings	1.80		0.67	0.33	0.23	440.00	*	0.76		18.00	13.00	1.43	37.00	0.67		f
06-3981-157625	31043040340000	Puskarenko 1	1488	1502	1495	Utica	cuttings	1.87		0.70	0.52	0.28	378.00		-1.00		28.00	15.00	1.86	37.00	0.57		f
06-3981-157626	31043040340000	Puskarenko 1	1502	1514	1508	Utica	cuttings	1.93		0.77	0.55	0.30	420.00		0.40		28.00	16.00	1.83	40.00	0.58		f
06-3981-157627	31043040340000	Puskarenko 1	1514	1528	1521	Utica	cuttings	2.01		0.81	0.56	0.25	475.00		1.39		28.00	12.00	2.24	40.00	0.59		f
06-3981-157628	31043040340000	Puskarenko 1	1528	1539	1533.5	Utica	cuttings	2.20		1.00	0.76	0.30	473.00		1.35		35.00	14.00	2.53	45.00	0.57	lc	f
06-3981-157629	31043040340000	Puskarenko 1	1550	1564	1557	Utica	cuttings	1.66		0.88	0.69	0.29	471.00		1.32		42.00	17.00	2.38	53.00	0.56		f
06-3981-157630	31043040340000	Puskarenko 1	1564	1573	1568.5	Utica	cuttings	1.74		0.88	0.56	0.29	459.00		1.10		32.00	17.00	1.93	51.00	0.61		f
06-3981-157631	31043040340000	Puskarenko 1	1573	1593	1583	Utica	cuttings	2.20		0.87	0.56	0.29	478.00		1.44		25.00	13.00	1.93	40.00	0.61		f
06-3981-157632	31043040340000	Puskarenko 1	1593	1604	1598.5	Utica	cuttings	2.36		0.93	0.58	0.27	413.00		0.27		25.00	11.00	2.15	39.00	0.62		f
06-3981-157633	31043040340000	Puskarenko 1	1604	1614	1609	Utica	cuttings	1.83		0.66	0.42	0.27	469.00	*	1.28		23.00	15.00	1.56	36.00	0.61		f
06-3981-157634	31043040340000	Puskarenko 1	1614	1627	1620.5	Utica	cuttings	1.95		0.74	0.50	0.27	472.00		1.34		26.00	14.00	1.85	38.00	0.60	lc	f
06-3981-157635	31043040340000	Puskarenko 1	1627	1641	1634	Utica	cuttings	1.69		0.75	0.41	0.25	420.00	*	0.40		24.00	15.00	1.64	44.00	0.65		f
06-3981-157636	31043040340000	Puskarenko 1	1641	1654	1647.5	Utica	cuttings	1.75		0.76	0.48	0.25	360.00	*	-1.00		27.00	14.00	1.92	43.00	0.61		f
06-3981-157637	31043040340000	Puskarenko 1	1654	1667	1660.5	Utica	cuttings	2.06		0.83	0.51	0.26	483.00		1.53		25.00	13.00	1.96	40.00	0.62		f
06-3981-157638	31043040340000	Puskarenko 1	1667	1679	1673	Utica	cuttings	2.17		0.88	0.59	0.25	435.00		0.67		27.00	12.00	2.36	41.00	0.60	lc	f
06-3981-157639	31043040340000	Puskarenko 1	1679	1684	1681.5	Utica	cuttings	1.84		0.75	0.49	0.25	428.00	*	0.54		27.00	14.00	1.96	41.00	0.60		f
06-3981-157640	31043040340000	Puskarenko 1	1684	1696	1690	Utica	cuttings	1.76		0.72	0.48	0.26	443.00	*	0.81		27.00	15.00	1.85	41.00	0.60		f
06-3981-157641	31043040340000	Puskarenko 1	1696	1705	1700.5	Utica	cuttings	1.95		0.86	0.53	0.26	410.00		0.22		27.00	13.00	2.04	44.00	0.62		f
06-3981-157642	31043040340000	Puskarenko 1	1705	1721	1713	Utica	cuttings	1.92		0.80	0.49	0.25	405.00	*	0.13		26.00	13.00	1.96	42.00	0.62	lc	f
06-3981-157643	31043040340000	Puskarenko 1	1721	1734	1727.5	Utica	cuttings	1.63		0.65	0.31	0.26	385.00	*	-1.00		19.00	16.00	1.19	40.00	0.68		n/a
06-3981-157644	31043040340000	Puskarenko 1	1734	1747	1740.5	Utica	cuttings	1.82		0.91	0.49	0.27	412.00	*	0.26		27.00	15.00	1.81	50.00	0.65	c	f
06-3981-157645	31043040340000	Puskarenko 1	1747	1759	1753	Utica	cuttings	1.23		0.50	0.32	0.28	413.00	*	0.27		26.00	23.00	1.14	41.00	0.61		f
06-3981-157646	31043040340000	Puskarenko 1	1759	1772	1765.5	Utica	cuttings	0.97		0.45	0.30	0.27	422.00	*	0.44		31.00	28.00	1.11	46.00	0.60		f
06-3981-157647	31043040340000	Puskarenko 1	1772	1782	1777	Utica	cuttings	0.73		0.35	0.31	0.25	372.00	*	-1.00		42.00	34.00	1.24	48.00	0.53		f
06-3981-157648	31043040340000	Puskarenko 1	1782	1800	1791	Utica	cuttings	0.93		0.37	0.40	0.30	408.00	*	0.18		43.00	32.00	1.33	40.00	0.48		f
06-3981-157649	31043040340000	Puskarenko 1	1800	1815	1807.5	Utica	cuttings	1.13		0.48	0.45	0.29	374.00	*	-1.00		40.00	26.00	1.55	42.00	0.52	lc	f
06-3981-157650	31043040340000	Puskarenko 1	1815	1828	1821.5	Utica	cuttings	1.33		0.67	0.42	0.24	393.00	*	-1.00		32.00	18.00	1.75	50.00	0.61		f
06-3981-157651	31043040340000	Puskarenko 1	1828	1843	1835.5	Utica	cuttings	1.35		0.58	0.50	0.25	409.00		0.20		37.00	19.00	2.00	43.00	0.54		f
06-3981-157652	31043040340000	Puskarenko 1	1843	1857	1850	Utica	cuttings	1.76		0.81	0.76	0.30	389.00		-1.00		43.00	17.00	2.53	46.00	0.52	c	f
06-3981-157653	31043040340000	Puskarenko 1	1857	1870	1863.5	Utica	cuttings	1.54		0.68	0.59	0.26	439.00		0.74		38.00	17.00	2.27	44.00	0.54		f
06-3981-157654	31043040340000	Puskarenko 1	1870	1881	1875.5	Utica	cuttings	1.33		0.60	0.40	0.25	404.00	*	0.11		30.00	19.00	1.60	45.00	0.60		f
06-3981-157655	31043040340000	Puskarenko 1	1881	1889	1885	Utica	cuttings	1.30		0.42	0.29	0.24	402.00	*	0.08		22.00	18.00	1.21	32.00	0.59	lc	f
06-3981-157656	31043040340000	Puskarenko 1	1889	1909	1899	Utica	cuttings	1.39		0.58	0.49	0.25	418.00	*	0.36		35.00	18.00	1.96	42.00	0.54		f
06-3981-157657	31043040340000	Puskarenko 1	1927	1937	1932	Utica	cuttings	1.74		0.78	0.59	0.29	541.00		2.58		34.00	17.00	2.03	45.00	0.57		f
06-3981-157658	31043040340000	Puskarenko 1	1967	1977	1972	Utica	cuttings	1.45		0.63	0.56	0.29	470.00		1.30		39.00	20.00	1.93	43.00	0.53		f

Note: "-1" indicates not measured or meaningless ratio

* Tmax data not reliable due to poor S2 peak

TOC = weight percent organic carbon in rock
S1, S2 = mg hydrocarbons per gram of rock
S3 = mg carbon dioxide per gram of rock
Tmax = °C

HI = hydrogen index = S2 x 100 / TOC
OI = oxygen index = S3 x 100 / TOC
S1/TOC = normalized oil content = S1 x 100 / TOC
PI = production index = S1 / (S1+S2)
Calculcated%VRo = 0.0180 x Tmax - 7.16 (Jarvie et al., 2001)
Measured %Ro = measured vitrinite reflectance

Notes:
c = Rock-Eval analysis checked and confirmed
lc = Leco TOC analysis checked and confirmed

Pyrogram:
n=normal
ltS2sh = low temperature S2 shoulder
ltS2p = low temperature S2 peak
htS2p = high temperature S2 peak
f = flat S2 peak