

### "Proving Up the Utica's Liquids Window" November 2012

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### **Overview of Utica Shale**



#### Asset Overview <sup>(1)</sup>

#### ~ 128,000 gross (64,000 net) acres

- Focused within the wet gas/retrograde condensate and mature oil windows of the Utica/Point Pleasant
- 5 year lease terms that are extendable with 5 year options
- Continue to pursue attractive acreage acquisition opportunities
- 50% interest / 100% operated
- 455 MBOE 910 MBOE EUR / well <sup>(2)</sup>
- 781 gross locations <sup>(3)</sup>
- 36.4 MMBoe of gross original oil in place per section <sup>(2)</sup>

#### 2012 Activities Update (1)

- Currently running two rigs
- Spudded twelve wells

#### 2013 Planned Activities (4)

- Plan to drill approximately 50 gross wells
- CAPEX (net): \$215 to \$225 million



(1) 3Q'12

Preliminary management estimates, actual results may vary
Based on Gulfport gross acreage and 160-acre spacing

(4) As of November 6, 2012

# **Utica Shale – Summary of Wells Tested**

						Production Mix				
Well Name	County	Completion Date	Length of Lateral (feet)	Frac Stages	Peak IP Test (Boe/d) <sup>(1)</sup>	Oil	Gas	NGLs	Shrink Factor <sup>(1)</sup>	
Wagner 1-28H	Harrison	5/28/12	8,143	28	4,650	9%	50%	40%	18%	
Boy Scout 1-33H	Harrison	6/13/2012	7,974	22	3,456	45%	26%	29%	25%	
Groh 1-12H	Guernsey	7/7/2012	5,414	16	1,935	61%	20%	19%	18%	
Shugert 1-1H	Belmont	7/27/2012	5,758	16	4,911	3%	56%	41%	17%	
Ryser 1-25H	Harrison	8/11/2012	8,291	23	2,914	51%	27%	22%	21%	
BK Stephens 1-14H <sup>(2)</sup>	Harrison	9/19/2012	5,276	19	3,007	41%	34%	25%	11%	

• First six wells averaged a peak rate of 1,006 barrels of condensate per day, 8.17 MMCF of natural gas per day and 1,111 barrels of NGLs, or 3,479 BOEPD<sup>(1)</sup>

- Production mix of included approximately 29% condensate, 39% natural gas, and 32% natural gas liquids



Source: Company filings

- (1) Assumes full ethane recovery
- (2) Test rate reflecting a 30-day resting period and the well will return to complete a 60 day resting period

### **Targeting the Acreage**

When entering the Utica, Gulfport's science team researched public data sources to find available information regarding the geology and petrophysical characteristics of the play. Utilizing the team's initial research, Gulfport:

- 1. Targeted the liquids windows
- 2. Prepared Point Pleasant TOC map
- **3. Mapped the Point Pleasant Thickness**
- 4. Focused on Overlapping "Sweet Spot" to Acquire Acreage



# **Targeted the Liquids Windows**

Our Main target is the "Wet Gas" phase of the hydrocarbon system. Multiple reasons include: valuable liquids increase profitability, a likely increase in reservoir pressures should aid in recoveries and provide energy to help move the larger liquid molecules through the small pore network, Kerogen develops internal pores, enhancing the total reservoir pore storage.

The dry gas window will work but likely will be less profitable. The oil window ability to produce is questionable and depending on pore sizes and formation pressure, may not be a regional "resource type" play. In this region natural fractures may dictate production



In this age rock, the types of maturity indicators include the regression analysis of the thermal color alteration (CAI) of conodonts as compared to the reflectance of vitrinite (Ro)\*. Additional measurement from Rock-Eval analysis indicate can indicate maturity, along with indication of the rocks ability to generate hydrocarbons and the type of hydrocarbons generated.

\*Vitrinite is absent in pre-Silurian rocks because land plants had not yet evolved



Maturity windows source from: Patchen, D.G., and 17 others, 2006, A geologic play book for Trenton-Black River Appalachian Basin exploration: Final report prepared for U.S. Department of Energy.

### **Prepared Point Pleasant TOC (Total Organic Carbon) Map**

TOC is measure of the organic carbon in a rock, expressed as weight percent, used as a fundamental parameter in classifying source rocks in conjunction with kerogen type and maturation. It is derived from organic debris from living and dead organisms incorporated into sediments during deposition. Although a good source rock must have high TOC, not all organic matter is created equal. There must be significant hydrogen associated with the carbon, in order to facilitate hydrocarbon generation.



PETROLEUM POTENTIAL	TOC (WT. %)
POOR	0 - 0.5
FAIR	0.5 - 1
GOOD	1 - 4
VERY GOOD	2 - 4
EXCELLENT	> 4



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# **Mapped Point Pleasant Thickness (Isopach Mapping)**

Lake Warrei Crawford Clarion lefferen Lawre 120 Armstron Richland Columbiana Indiana Carroll Westmoreland Harrison Somerse Fayette Aarshal Green Fairfield Monongalia Morga Wetzel Hocking Marion Preston Taylo Athens Harrison Doddridge Ritchie

Good general "rule of thumb" should have a thickness > 100' of interval



### **Focused on Overlapping "Sweet Spot" to Acquire Acreage**





# **Planned Early for Pipeline Infrastructure / Takeaway**

- 1. Gulfport dedicated acreage to MarkWest Energy Partners ("MarkWest")
- 2. MarkWest is developing gathering and compression assets in Harrison, Belmont, and eastern Guernsey counties to provide gathering, processing, fractionation, and marketing services for Gulfport Energy
- 3. MarkWest will have 20 inch main lines complete in core area at the end of 1Q2013
- 4. Gulfport and MarkWest worked together to plan drill sites and pipeline routes
- 5. Recently signed letter of intent with MarkWest to gather Gulfport's condensate
- 6. Gulfport will have rail, barge and pipeline options to avoid being "price takers" in the play



### **MarkWest Midstream Facilities**



Harrison Processing and Fractionation Complex								
Under Construction	<u>Total</u>							
Harrison Interim (4Q2012)	60 MMcf/day							
Harrison I (1Q2013)	125 MMcf/day							
Harrison II (TBD)	200 MMcf/day							
C3+ Fractionation (4Q2013)	60 MBPD							
Interconnect to TEPPCO pipeline (4Q2013)								
Interconnect to ATEX pipeline (1Q2014)								
De-ethanization (1Q2014)	40 MBPD							

Noble Processing Construction Complex								
Planned Construction	<u>Total</u>							
Interim Noble Refrigeration (4Q12)	45 MMcf/day							
Noble I (3013)	200 MMcf/day							

#### **NGL** Pipelines

#### **Under Construction**

NGL Pipeline from Harrison to Majorsville (4Q2013)

NGL Pipeline from Harrison to Noble (4Q2013)



# **Post Leasing / Pre Drilling Science**

In August 2011, Gulfport employed Von Gonten and Associates to conduct additional science prior to the start of drilling. Von Gonten's research findings suggested:

- **1. Similarity Between the Utica Shale and Eagle Ford**
- 2. ~225 ft. Frac Stages Were Optimal Based Upon Frac Simulations
- 3. Effective Drainage Half Lengths Could Be as Short as 125 140 feet



### **Similarity Between the Utica Shale and Eagle Ford**



- The Point Pleasant member of the Utica is similar to the Eagle Ford
  - ~50% calcite and 20% clay content (which is similar to the Eagle Ford)
    - Higher carbonate content and low clay content have been important factors contributing to high deliverability Eagle Ford well
  - Porosity is in excess of 5%
  - 95% is an intrakerogen porosity system
  - Permeability is similar to that of the Eagle Ford

- The Point Pleasant member of the Utica delivers excellent economics
  - Gulfport's position in the heart of the Utica wet gas window could yield well performance results on par with the most attractive shale plays
  - The Point Pleasant thickness appears to be essentially constant and thick across our acreage



### Frac Simulations Suggest 225 Ft. Stages

Based on a well with a 4,300 foot lateral and core data



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# **Drilling for Data**

When drilling began in the Utica, Gulfport:

- **1. Cored and Logged Entire Target Interval**
- 2. Studied Ingrain Digital Core Analysis
- 3. Subdivided the Rock Type Intervals
- 4. Engaged NuTech to Run Multiple Frac Simulations Prior to Drilling
- 5. Planned Optimized Drilling Target Line



### **Cored and Logged Entire Target Interval**







### **Studied Ingrain Digital Core Analysis : Overpressure and Organic Material**

- Analysis of Ion-milled Scanned Electron Microscopy ("SEM") images of the Point Pleasant formation indicate: .
  - Horizontal organic extrusion fractures may be indication of overpressure
  - Significant porosity development inside the organic material
  - Porosity and permeability results on par with samples from lower Eagle Ford







# **Studied Ingrain Digital Core Analysis : Eagle Ford Analog**

### Utica Shale – Eagle Ford Analog



- Ion-milled SEM images show extensive organic porosity development in Point Pleasant formation
  - Organic matter porosity creates superior porosity and permeability in the rock
- Similar organic porosity development in Eagle Ford formation



### **Subdivided the Rock Type Intervals**



**NuTech Rock Analysis** 



### **Engaged NuTech to Run Multiple Frac Simulations**

### **Scenario Variables Include:**

### 1. Type of Sand

- a) High Strength Proppant
- b) Size of Sand
- c) Maximum Sand Concentration
- 2. Stage Length
- 3. Cluster Spacing
- 4. Average Pump Rate
- 5. Optimal Position of Perforations within the Point Pleasant
- 6. Ran CHK Buell #8-H Frac Information from the Completion Report Submitted to the Ohio DNR as Control Case
- 7. Compared 6 Proposals from 6 Service Companies



### **Sample Results of NuTech Simulations**



Scenario #	2190 Day CUM HC (MMSCF)	2190 Day Rate (MCFE/D)	2190 Day NPV(\$)	2190 Day ROI (%)	2920 Day CUM HC (MMSCF)	2920 Day Rate (MCFE/D)	2920 Day NPV(\$)	2920 Day ROI (%)	3650 Day CUM HC (MMSCF)	3650 Day Rate (MCFE/D)	3650 Day NPV(\$)	3650 Day ROI (%)
32	2,720	825	28,343,000	1079%	3,301	771	32,421,000	1235%	3,847	731	35,565,000	1354%
33	2,789	833	29,154,000	1061%	3,375	778	33,269,000	1211%	3,927	739	36,443,000	1326%
34	2,804	835	29,242,000	1019%	3,392	779	33,371,000	1163%	3,946	740	36,552,000	1274%
35	2,811	836	29,213,000	977%	3,399	780	33,342,000	1115%	3,953	741	36,526,000	1221%
36	2,813	836	29,115,000	935%	3,402	780	33,247,000	1068%	3,956	741	36,433,000	1170%
37	2,990	1,032	30,426,000	1060%	3,722	978	35,569,000	1240%	4,421	939	39,592,000	1380%
38	2,122	674	21,121,000	736%	2,597	634	24,462,000	852%	3,049	604	27,055,000	943%
39	14,200	3,267	160,644,114	2014%	16,470	2,941	176,588,614	2214%	18,525	2,713	188,416,446	2362%
40	16,247	4,364	179,681,978	2253%	19,298	4,005	201,061,474	2521%	22,107	3,726	217,289,376	2724%
41	11,858	2,860	131,913,777	1654%	13,834	2,577	145,768,046	1828%	15,639	2,365	156,179,209	1958%
42	12,680	3,044	141,848,713	1556%	14,791	2,762	156,697,608	1718%	16,727	2,571	167,931,076	1842%
43	11,778	2,950	128,613,968	1595%	13,818	2,661	142,968,533	1773%	15,679	2,470	153,663,812	1906%

### **Planned Optimized Drilling Target Line**





### **Completing Wells and Refining Techniques**

To refine and plan completion techniques on the wells, Gulfport:

- **1. Ran DFIT Tests**
- 2. Designed a Seismic Survey With MicroSeismic
- 3. Planned and Executed the Frac Job
- 4. Compared Frac Results for Each Stage To Fine Tune the Optimum Well Path
- 5. Ran a Production Log
- 6. Planned Future Tests of Spacing Between Wells
- 7. Still learning



### **Ran DFIT (Diagnostic Fracture Injection Test)**





# Designed a Seismic Survey With MicroSeismic

### MicroSeismic Surface Array





### **Planned and Executed the Frac Job**





### Results on One Stage of MicroSeismic Survey



#### **Depth View Looking Northeast**







### **Compared Frac Results To Fine Tune the Well**





### **Production log sample**



### **Planned Future Tests of Spacing Between Wells**





### **Still Learning**

**Gulfport is still collecting data and conducting science to learn more about:** 

- **1. Bottom Hole Pressure Data**
- 2. Surface Shut in Pressures
- 3. PVT (Pressure Volume Temperature) Data
- 4. Best Spacing Between Horizontal Laterals
- 5. Optimal Frac Design
- 6. Best Drilling Plan
- 7. Ideal Period to Rest the Wells
- 8. Basic Approach: Drill long laterals (8,000' +) and frac with short stages for best combination of EUR's and economics



### Conclusion

Through Gulfport's science staff's exemplary technical capabilities, we were able to:

- 1. Conduct Geological and Petrophysical Research
- 2. Choose Acreage Buying Area
- 3. Plan for Product Takeaway and Optimal Drilling Locations
- 4. Propose Well Path Based on Drilling and Completion Techniques
- 5. Drill Wells and Gathered Data
- 6. Frac Wells and Refine Drill Paths and Completions
- 7. We Still Have A Lot to Learn...





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