



# **SPE Meeting March 22, 2018**

**Bordeaux Banquet Room  
Crowne Plaza Lansing West  
925 South Creyts Road  
Lansing, MI 48917  
517 323-4190  
(see Page 3 map)**

**5:30 PM– 6:00 PM** – Social Hour  
**6:00 PM** – Dinner  
Presentation after Dinner  
Cost (including dinner): \$30  
Receipt Available

**Topic:**  
**Extreme Limited Entry Design Improves Distribution  
Efficiency in Plug-n-Perf Completions: Insights from  
Fiber-Optic Diagnostics**

**By:**  
**Jim Brewer**

Please RSVP by March 16,  
Ben Updyke (Program Chair)  
313-235-1115  
[updykeb@dteenergy.com](mailto:updykeb@dteenergy.com)

# **Extreme Limited Entry Design Improves Distribution Efficiency in Plug-n-Perf Completions: Insights from Fiber-Optic Diagnostics**

**Jim Brewer**  
**Shell Oil Company**

## **Abstract**

Industry has known for some time that the plug and perf completion method leaves individual clusters over-stimulated and many time under or unstimulated.

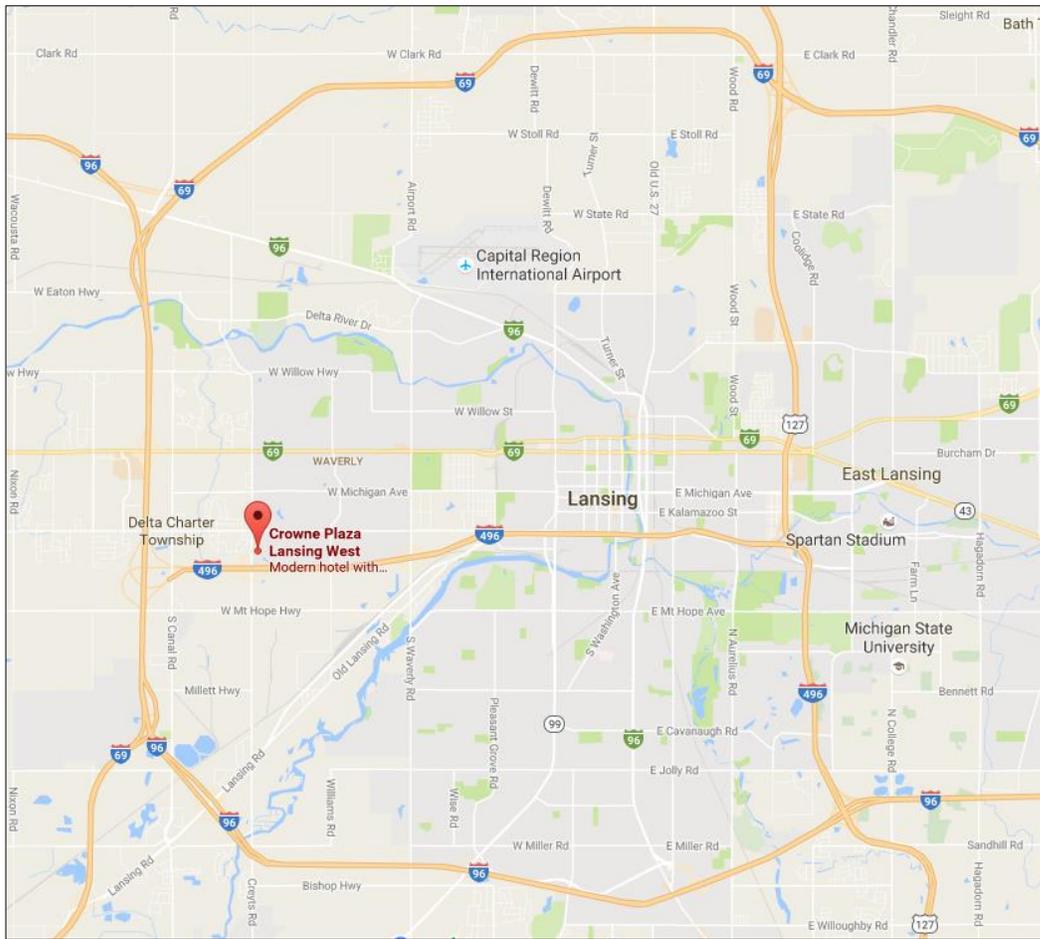
We designed an experiment to quantify the results of extreme limited entry perforation design. From toe to heel, we varied the number of perforations per stage from 9 to 7 which resulted in a designed differential pressure of 2,000 psig to 3,000 psig respectively. During the hydraulic fracture stimulation, we measured the fluids and slurry flowing into each cluster using our distributed acoustic sensing fiber. Likewise, when put on production, we measured the acoustic signature to figure out production rates along the lateral.

Results were very interesting. Every cluster broke down and took significant proppant volumes. Proppant distribution in the clusters were much more even along the lateral. At 30 days online, all clusters produced gas and later on about 80% of the clusters were producing gas according to the distributed acoustic sensing fiber. This paper compares extreme limited entry design with another well in the same field where we used the normal limited entry design.

## **Biography**

Jim Brewer is a Senior Staff Production Engineer for Shell Oil Company. He is a Global Subject Matter Expert, for Royal Dutch Shell, in Completions Concept Select and Artificial Lift. Jim earned an Associates of Applied Science in Petroleum Engineering Technology from Northwestern Michigan College and a Bachelor's of Science in Petroleum Engineering from Montana College of Mineral Science and Technology. He is currently assigned to Shell's Unconventional Resource Group where he works on the Completions and Technology Effectiveness Team which is responsible for development concepts, completion design, hydraulic fracturing design, and integrated modeling. Jim is the international focal point responsible for helping new and developing unconventional plays around the globe. Domestically, he is the focal point working with the research department to evaluate and implement new unconventional technologies. He is a long time SPE member and serves as a technical paper review volunteer for artificial lift and hydraulic fracturing. Jim works remotely out of his home near Gladwin and commutes internationally.

Map to Bordeaux





**Michigan Section News Events & More - 2018**

<http://connect.spe.org/Michigan/Home/>

**2017-2018 Michigan Section Officers**

Chairperson:	Sue Burla	248-205-7414	susan_burla@transcanada.com
Program Chair:	Ben Updyke	313-235-1115	updykeb@dteenergy.com
Treasurer:	<b>TBD</b>		
Secretary:	Kishan Makwana	248-205-4543	kishan_makwana@transcanada.com
Scholarship Chair	Stanley George	248-205-4555	stan_george@transcanada.com

**SPE Michigan Section is actively seeking potential officers to serve on the executive committee.** If you are interested in joining the Michigan Section executive committee, please contact any of the current committee members.

**2018 Michigan Section SPE Scholarship**

The Michigan Section of the Society of Petroleum Engineers (SPE) will be awarding 2018 Michigan Section SPE scholarship of \$1,000. Please stay tuned for more information about the scholarship application.

For the future scholarship award information, please see <http://connect.spe.org/Michigan/AboutUs/Scholarships/>.

**2017-2018 SPE Michigan Section Meeting Schedule (Lansing, MI)**

Tue May 18, 2018    *Greg Galloway* Wellbore Integrity Restoration; New Life for Old Wells

**Michigan Basin Geological Society (MBGS) Meeting Schedule ([www.mbgs.org](http://www.mbgs.org))**

Please visit [www.mbgs.org](http://www.mbgs.org) to get more information about Michigan Basin Geological Society.

**Continued Education**

SPE understands the importance of continuing education for keeping skills up to date, improving expertise or learning new techniques.

You can grow your knowledge by attending short programs and courses, such as:

- Dig deeper without leaving your desk <https://webevents.spe.org>
- SPE Training Courses <http://www.spe.org/training/courses.php>
- American Association of Petroleum Geologists (AAPG) Education programs <http://www.aapg.org/education/>
- Field trips with Michigan Basin Geological Society [http://www.mbgs.org/field\\_trips.html](http://www.mbgs.org/field_trips.html)
- Professional Engineer information: go to [www.ncees.org](http://www.ncees.org) or <http://www.dleg.state.mi.us/bcsc/forms/eng/peexam.pdf> for application process for Professional Engineers License in Michigan.

## Society of Petroleum Engineers Upcoming Events:

6 - 8 Mar 2018	IADC/SPE Drilling Conference and Exhibition 	Conference		Fort Worth, Texas, USA
27 - 28 Mar 2018	SPE/ICoTA Coiled Tubing and Well Intervention Conference and Exhibition 	Conference		The Woodlands, Texas, USA
10 - 11 Apr 2018	SPE Workshop: Well Integrity Excellence in a Low Oil Price Environment 	Workshop		Galveston, Texas, USA
14 - 18 Apr 2018	SPE Improved Oil Recovery Conference 	Conference		Tulsa, Oklahoma, USA
17 - 18 Apr 2018	SPE/IADC Managed Pressure Drilling and Underbalanced Operations Conference and Exhibition 	Conference		New Orleans, Louisiana, USA
22 - 26 Apr 2018	SPE Western Regional Meeting 	Conference		Garden Grove, California, USA
30 Apr - 3 May 2018	Offshore Technology Conference 	Conference		Houston, Texas, USA
8 - 10 May 2018	SPE Workshop: Shale Development Optimization-The Quest for Efficiency and Profitability 	Workshop		San Antonio, Texas, USA
19 - 20 Jun 2018	SPE Workshop: Smart Integration in Production System Modeling 	Workshop		Galveston, Texas, USA
8 - 13 Jul 2018	SPE Forum: Drilling and Completion Geomechanics - Integrating Knowledge and Workflows to Maximize Asset Value 	Forum		Colorado Springs, Colorado, USA
23 - 25 Jul 2018	SPE/AAPG/SEG Unconventional Resources Technology Conference 	Conference		Houston, Texas, USA
14 - 15 Aug 2018	SPE Workshop: Enhancing HSE Performance for Drilling Operations 	Workshop		The Woodlands, Texas, USA
28 - 30 Aug 2018	SPE Workshop: Fiber-Optic Sensing Applications for Well, Reservoir, and Asset Management 	Workshop		Denver, Colorado, USA
28 - 30 Aug 2018	SPE Artificial Lift Conference and Exhibition - Americas 	Conference		The Woodlands, Texas, USA
5 - 6 Sep 2018	SPE Liquids-Rich Basins Conference - North America 	Conference		Midland, Texas, USA
24 - 26 Sep 2018	SPE Annual Technical Conference and Exhibition 	Conference		Dallas, Texas, USA
9 - 10 Oct 2018	SPE/ICoTA Workshop: Refracturing Through Optimized Interventions 	Workshop		San Antonio, Texas, USA

## Other News

We are always looking for **guest speakers** for upcoming SPE meetings. If you have a talk on a geological or engineering topic, we can provide the audience.

If you are interested in **advertising** in the Michigan Section newsletter, please contact Kishan Makwana. Proceeds from advertising go to the SPE scholarship program.

**Comments? Questions? Concerns?** How can your SPE section serve you better? To voice your opinion on any aspect of section membership, please contact any of the officers or grab their attention at the meetings.