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August 14th, 2009

Innovative Energy Technology Program
Research and Technology Branch
Alberta Department of Energy
9<sup>th</sup> Floor, North Petroleum Plaza
9945 – 108 Street
Edmonton, Alberta T5K 2G6
Attention: Manager, Innovative Energy Technologies Program

Re: Innovative Energy Technology Program Annual Report for 2008
Project: 03-064 - Deep Basin Tight Gas Horizontal Well Stimulation

EnCana Corporation is pleased to submit the attached Innovative Energy Technology Program Annual Report for 2008 pertaining to the Deep Basin Tight Gas Horizontal Well Stimulation Project.

Should you have questions regarding any of the documents enclosed, please contact me at (403) 645-8985.

Sincerely,

Dean Jenkins, P.Eng. Group Lead Completions - Bighorn Canadian Deep Basin Business Unit Canadian Foothills Division EnCana Corporation

# Innovative Energy Technologies Program – Annual Report PROJECT: 03-064 DEEP BASIN TIGHT GAS HORIZONTAL WELL STIMULATION

Submitted to:
Research and Technology Branch
Alberta Department of Energy
Attention: Manager, Innovative Energy Technologies Program
9<sup>th</sup> Floor, North Petroleum Plaza
9945 – 108 Street
Edmonton, Alberta T5K 2G6

Submitted by:
EnCana Corporation's
Deep Basin Development and Measurement of Marginal Zones
Project Team
Dean Jenkins
Kevin Lubert
Wes Dainard
Dustin Hoffman

## **Report Abstract**

The original Deep Basin Tight Gas Horizontal Well Stimulation project approved under Round Three of the IETP was very specific in scope in that Halliburton's Surgi-Frac stimulation technique was to be performed and evaluated on horizontal wells in EnCana's Leland area of the deep basin. All that was planned under this IETP project for 2008 was to re-enter the 100/13-12-59-26W5 openhole horizontal well, fish out the original frac tool left in the wellbore during the original completion then multi-stage fracture stimulate the well utilizing the Surgi-Frac stimulation technique. Due to a variety of circumstances, an alternate multi-stage stimulation technique was used to stimulate the 13-12 well. This 2008 Annual Project Report will be limited to a summary of the current project team, activities and operations to date, the reasoning for deviating from the original plan and future potential opportunities. Based on this deviation and use of an alternate multi-stage horizontal well stimulation technique in the deep basin, the applied IETP project cost for 2008 is estimated at 335K\$ to fish and stimulate the 13-12 well.

## **Summary Project Status Report**

## Project Team

Team Leader initial: Dean Jenkins, Project Manager

changed to: Kevin Lubert

Key Team Members initial: Wes Dainard, Completions

changed to: no change

initial: Kent Peters, Reservoir

changed to: Dustin Hoffman

## **Activities and Operations**

## 100/13-12-59-26W5M HZ

06/11/30 to 07/01/03 drilled well 07/01/16 to 07/03/15 initial completion

08/01/05 to 08/02/12\* workover and stimulation

#### 100/04-13-59-26W5 HZ

08/12/16 to 09/02/24\* drilled well

09/02/04 to 09/03/11 initial completion

## 100/15-15-59-26W5 HZ

09/02/05 to 09/03/10 drilled well

09/03/12 to 09/03/23 initial completion

 $2008\ \text{IETP}$  Annual Report – Project No. 03-064 - Deep Basin Tight Gas Horizontal Well Stimulation  $1\ \text{of}\ 6$ 

<sup>\*</sup>includes 2008 activities

The main reasons for deviating from our original plan of utilizing Halliburton's Surgi-Frac stimulation technique was due to the uncertainty of why the Surgi-Frac tool got stuck in the well during the original completion operation and to mitigate against the potential risk of poor openhole wellbore integrity, a casing liner was run on the 100/13-12 well after the stuck Surgi-Frac tool was managed. Also at this time, based on success of a different horizontal well stimulation technology applied in another EnCana area, swell frac packers were run on the casing liner and used instead of the Surgi-Frac stimulation technique.

## **Well Information**

Well Map

(see Figure 1)

## 2008 Activities and Difficulties

100/13-12-59-26W5

- attempted to fish out Surgi-Frac tool with drilling rig (did not recover fish, likely pushed to toe of horizontal leg)
- conditioned wellbore and ran casing liner complete with swell frac packers with drilling rig
- stimulated Falher horizontal leg with frac packer technology

## Well List and Status

100/13-12-59-26W5 stimulated and producing

Wellbore Schematics

(see Figure 2)

#### **Production Performance**

**Production History** 

(see Figure 3)

## **Pilot Economics**

## **Project Costs**

Well	Activity	Total Cost	Project	Proposed
			Incremental	Project Applied
			Cost	Cost
		(field estimate)	(field estimate)	(field estimate)
		K\$	K\$	K\$
100/13-12-59-26W5	Fish/Stimulate	3,109	1,473	335

## **Future Operating Plan**

## Project Schedule Update

#### 2009

EnCana drilled 2 Falher horizontal wells in the Leland area as part of its 2009 capital program.

100/04-13-59-26W5 stimulated and producing 100/15-15-59-26W5 stimulated and shut-in

The Leland area is mainly in a winter access only area and also on caribou restricted lands, which minimizes the number of workable days each year. Operations typically start in December after freeze up and end any time shortly after March 15<sup>th</sup> when the caribou related access restrictions can start and the ground starts to thaw. In addition, the same equipment and crews used for the Surgi-Frac technique are also used for another stimulation technique of Halliburton's called CobraMax. The equipment and crews were committed to other clients utilizing the CobraMax technique, including EnCana in areas other than the deep basin. Due to uncertainty in equipment and crew availability coupled with the short season of accessibility and that both wells were to be drilled, completed, tied-in and put on production to meet economic deliverables, a business decision was made to apply another frac packer technique instead of the Surgi-Frac stimulation technique.

## 2010

EnCana still plans to drill 2 Falher horizontal wells in the Leland area as part of its 2010 capital program. The locations have not been finalized and the completion technique to apply is still being reviewed.

#### 2011

At this stage the development plans for 2011 in the Leland area are similar to 2009 and 2010 and there may be opportunity to apply this IETP project to those wells.

The main concern is the risks to execute within the short season of accessibility will still be present. An earlier request was made to allow flexibility around the ability to utilize other horizontal well stimulation techniques to selectively place multiple fracture stimulations in a wellbore within the deep basin and also to expand the sub-surface area and strata to increase the potential number of opportunities. The decision was made to keep both as originally approved.

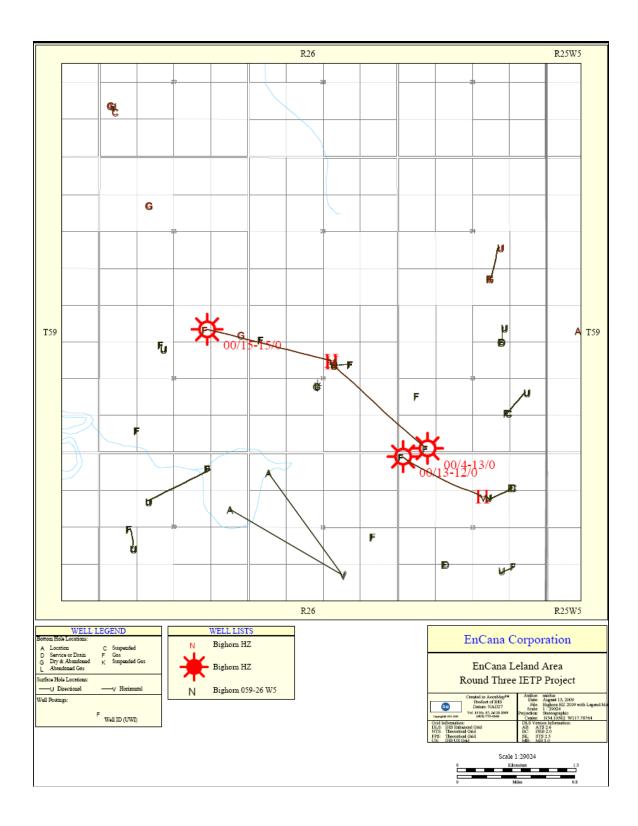


Figure 1 Project Area Map

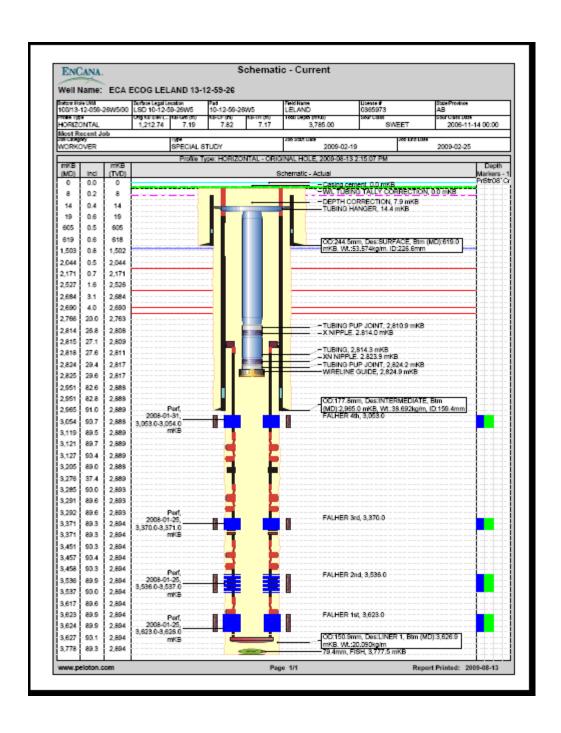


Figure 2 100/13-12-59-26W5 Wellbore Schematic

## 100/13-12-059-26W5 Production History

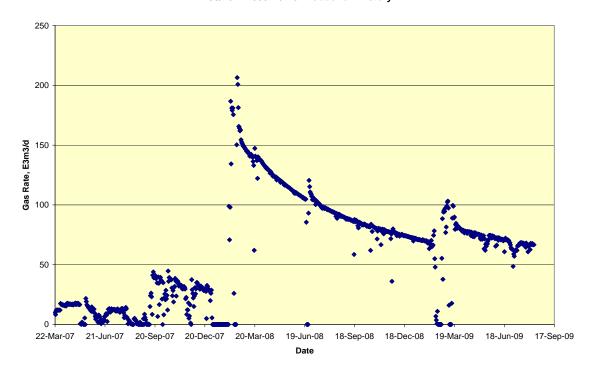


Figure 3 100/13-12-59-26W5 Production History