



Case Study 2042

Shallow Vertical Gas Well Cleanout Activities in East
Central Alberta Canada

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Presented by: ADL Oilfield Services

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Case Study for ADL Oilfield Services

Company Profile

Since 2004, ADL has provided expert well cleanout, stimulation and remediation services, using a precision Stable Foam generating system to successfully complete over 750 vertical and horizontal wells; including injection, disposal and production wells, plus pipeline cleanouts, remediation projects and foam assisted drilling. Major Oil & Gas producers look to ADL as the industry benchmark for generating Stable Foam at surface.

Business Situation

High consumer demand, coupled with a strategic need to sustain long term energy self-reliance, natural gas and tar sands represent the raw fuels of the future. Thousands of new wells are drilled yearly, while thousands more decline in production. A portion of the wells in decline are suffering from residual debris including bitumen, wax, clay and sand, due to formation collapse and also at times, caused by remedial well activities. High well pressures can drive debris further into the formation, with subsequent reduction in productivity.

Clients typically contact ADL Services when conventional methods of well cleaning fail, including: chemical flushing, slick water applications, pressurized gas or hydraulic applications and even re-fracturing.

Technical Situation

The following well case study represents a typical well condition assessed and addressed by ADL Services. The well is listed by location, characteristics and condition. The UWI number and sensitive owner information are withheld. The subject well includes background, description, solutions and objective well production before and after ADL Services intervention.

Well 2042 - Killam, Alberta Canada

This shallow, vertical natural gas well was drilled and cased in February 2004, jet perforated in May of 2004 and commencing of gas flow in July 2004. The well was fractured shortly thereafter in late July 2004 to augment well production. The ADL field assessment noted the well was experiencing declining production at the time of ADL servicing.

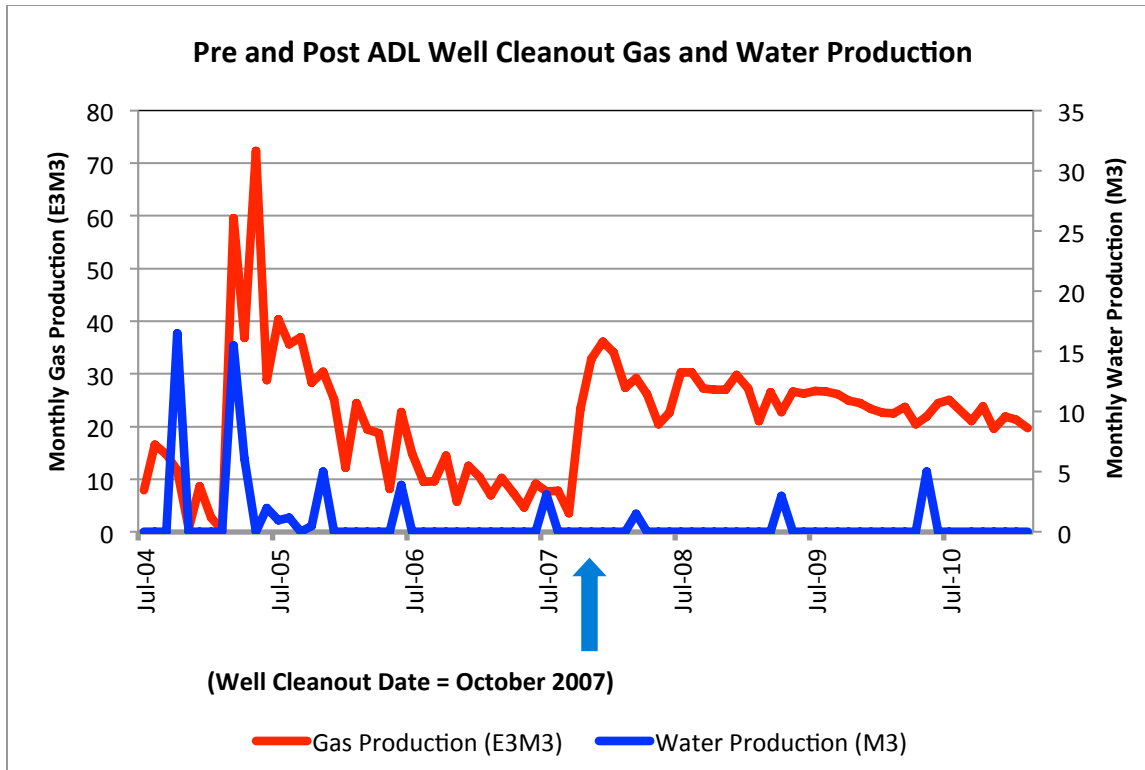
Solution

The ADL Work Design Plan was executed October 2007 including: a structured methodology focused well survey and schematic reviews, work layout targeting foam to the point of need, sampling, safety protocol, work execution, monitoring, reporting and cleanup. Particular well behaviors or personality was determined, allowing for customized foam design (both content and delivered volume), as well as defined the target application. Coil tubing delivered Stable Foam to the designated target area. The foam generated at surface was sampled to assure adequate foam quality. After testing, the foam was delivered at a low rate and pressure to the designated target zone at the predetermined foam density customized specifically for the personality and needs of the well.

The project Cleanout Report notes reflect Stable Foam extracted frac sand. Shut In Casing Pressures (SICP) were 1110 kPa before cleanout and 1,420 kPa post cleanout. Shut In Tubing Pressures (SITP) were 1120 kPa before cleanout and 1420 kPa post cleanout. The well was then placed back into production after 3.5 project hours.

Benefits

The following graph depicts well gas production before and after the ADL Stable Foam cleanout:



The extended well production, depicted in the above graph, shows a classic well production curve descending in gas production over nearly 2.5 years of continuous operation. Post cleanout production is significant and sustained for over 4 subsequent years.

Based on examination of extracted debris, it is concluded the well production was affected by accumulation of fine sand within the formation. A total of 1.2 m³ of excess fine sand was extracted from the well and formation. The Stable Foam application process required 3.5 project hours to assess stage, execute and complete.

Return on investment for one project day of assessment and cleanout is substantial noting the significant rise in sustained gas pressure and volume through the present. This client's well production has sustained, not requiring another cleanout since the October 2007 event.

30 Day Pre Cleanout – Post Cleanout Projected Production Revenue

Pre-Cleanout Production (M3)	Pre-Cleanout Production (BOE)	Pre-Cleanout Production Mcf gas	Pre-Cleanout Production Revenue	Post Cleanout Production (M3)	Post Cleanout Production (BOE)	Post Cleanout Production (Mcf)	Revenue Yield
3,600	21.92	127.08	\$572	23,400	142.47	826.02	\$3,717

60 – 90 Day Post Cleanout Projected Production Revenue

60 Day Post Cleanout Production (M3)	60 Day Post Cleanout Production (BOE)	60 Day Post Cleanout Production Mcf gas	60 Day Post Cleanout Production Revenue	90 Day Post Cleanout Production (M3)	90 Day Post Cleanout Production (BOE)	90 Day Post Cleanout Production (Mcf)	90 Day Post Cleanout Revenue Yield
56,200	342.18	1,983.86	\$8,927	92,300	561.98	3,258.19	\$14,662

120 Day Post Cleanout Projection Revenue & Annualized Revenue

120 Day Post Cleanout Projected Production (M3)	120 Day Post Cleanout Production (BOE)	120 Day Post Cleanout Production Mcf gas	Total Production Revenue Yield 120 Day Post Cleanout	Total Annualized Production 12 months (M3)	Total Annualized Production 12 months (BOE)	Total Annualized Production 12 months (Mcf)	Total Annualized Projected Revenue 12 months
126,300	769.00	4,458.39	\$20,063	378,900	2,306.99	13,375.17	\$60,188

Notes

*Revenues based on the BOE (Oil) value of **\$95**

*Revenues based on the gas Mcf value of **\$4.50**

The 30-day Pre-Cleanout Production and the 30/60/90/120-day Post-Cleanout data is based on actual Oil & Gas Production values for each well

**Total Annualized Post-Cleanout Production values were calculated based on 3x the 120-day actual Oil & Gas Production values for each well

*The 30-day Pre-Cleanout and the 30/60/90/120-day Post-Cleanout revenues are based on actual Oil & Gas Production values for each well

**Total Annualized Post-Cleanout Revenues calculated based on 3x the 120-day actual Oil & Gas Production values for each well
Assumes 1 BOE of natural gas = 164.24m3, per the *Fundamentals of Natural Gas: An International Perspective*, published by Pennwell, 2006 (publishers of Oil and Gas Journal)

Well productivity for the 30 day period prior to the cleanout intervention shows 3,600 m³ of production with a BOE equivalent of 21.92 projecting an estimated revenue value of \$572. Post cleanout production was significantly higher increasing production to 23,400 m³ with estimated projected revenues of \$3,717 after only 30 days. Annualized revenues of \$60,188 show a significant return on investment.

Summary

This subject natural gas well was experiencing steadily declining gas production due to an accumulation of fine sand within the well and formation. After 3.5 project hours, Stable Foam removed a total of 1.2 m³ of excess fine sand returning strong sustained gas production for well over 4 years to date.

Substantial increase in production and values and subsequent estimated projected revenues generated significant return on investment.