



America 2012
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Case Study: Louisiana USA - Encana Oil & Gas

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Customer and Case

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Application Description

3

FLEXIM Solution

4

Customer Benefits

Customer and Case

- Encana Oil and Gas (subsidiary of Encana Corp) 95% production is Natural Gas approx 1.2 trillion cubic feet (34 km³) annually.
- Encana owns approximately 2.6 million net acres of land in the United States,
- Key resource Shale plays include: Barnett, Haynesville, Jonah and Piceance.
- 2011 drilled & frac'd >450 wells in USA alone.
- Encana looking to reduce costs of well production with Multi well heads feeding into 1 separator. Requiring gas flow monitoring on or near well head prior to separation .



Encana Corp. Calgary HQ



Haynesville LA Frac well site

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Application - Customer Motivation

- Encana's current well operations has each individual Frac'd well contents, flow into 1st separator were its separates out the Gas and liquids. After separator the amount of gas and liquid is measured by a Senior Daniels Orifice meter (gas) and a Turbine meter (liquid)
- Flexim was asked to provide measurement results pre- Separation. This was done at two different Encana well sites Texas and Louisiana.
- Encana's motivation is to lower their well operations cost of by combining 2 or more wells into 1 separator.



Encana
Natural Gas
well
separator

Application - Technical Details

- **1st test (vertical pipe)**
 - **3" Carbon Steel Schedule 80 Pipe**
 - **0.6" wall thickness**
 - **K transducers**
 - **>950psig**
 - **Temperature >200deg C**
 - **Methane Gas**

- **2nd test (Horizontal pipe)**
 - **4" Carbon Steel Schedule 80 Pipe**
 - **0.6" wall thickness**
 - **K transducers**
 - **>950psig**
 - **Temperature >180deg C**
 - **Methane Gas**

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Solution - Installation

- 1st test we mounted a G7407 and the transducers in permalocks right @ the well on a 3" CS pipe. Meter ran within .5% of the reference meter. Signal quality was just above the operable limit due to challenging conditions
- 2nd Test we mounted both a portable G601 and a G7404 on a straight run 4" CS meter ran within .5% of ref meter with much better signal. Placement approx 30 feet from well head still 200 feet before separator



Flexim meter

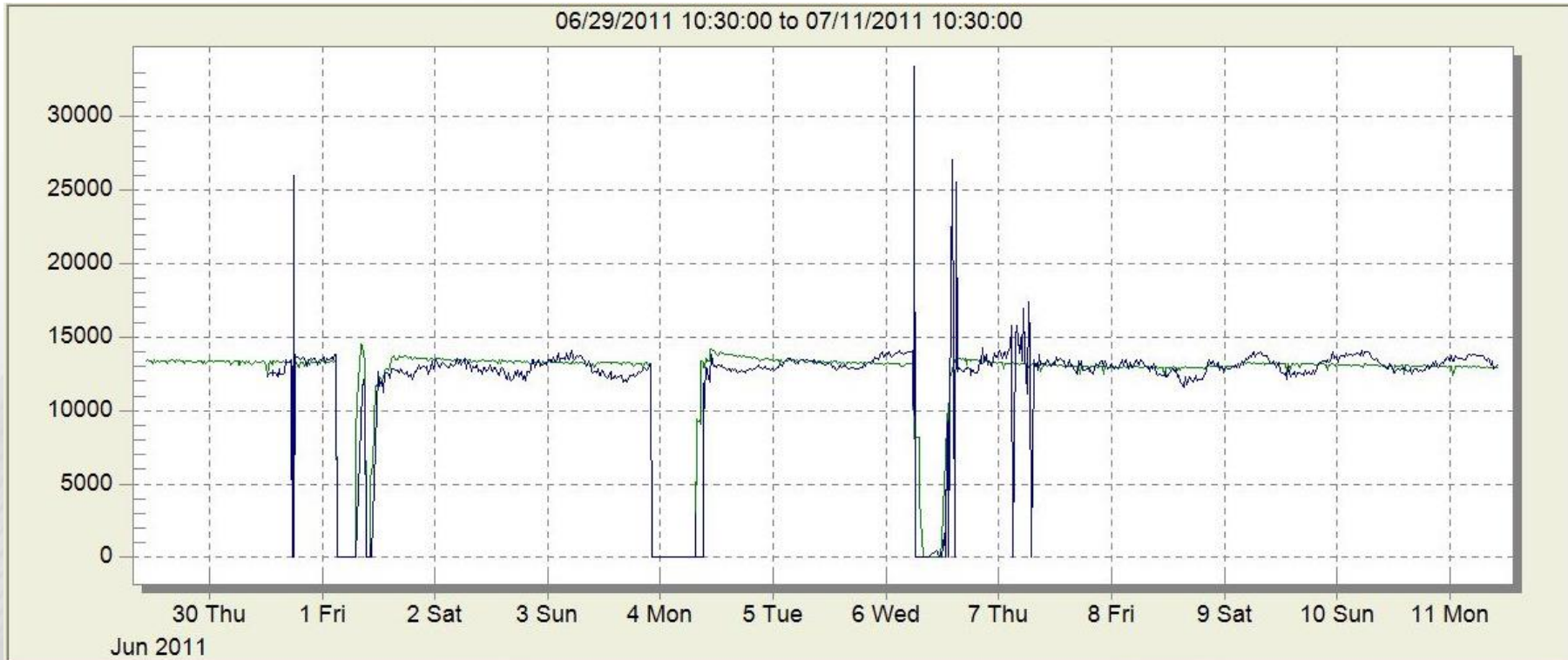
Xdcr

Permalock

Flexim meter

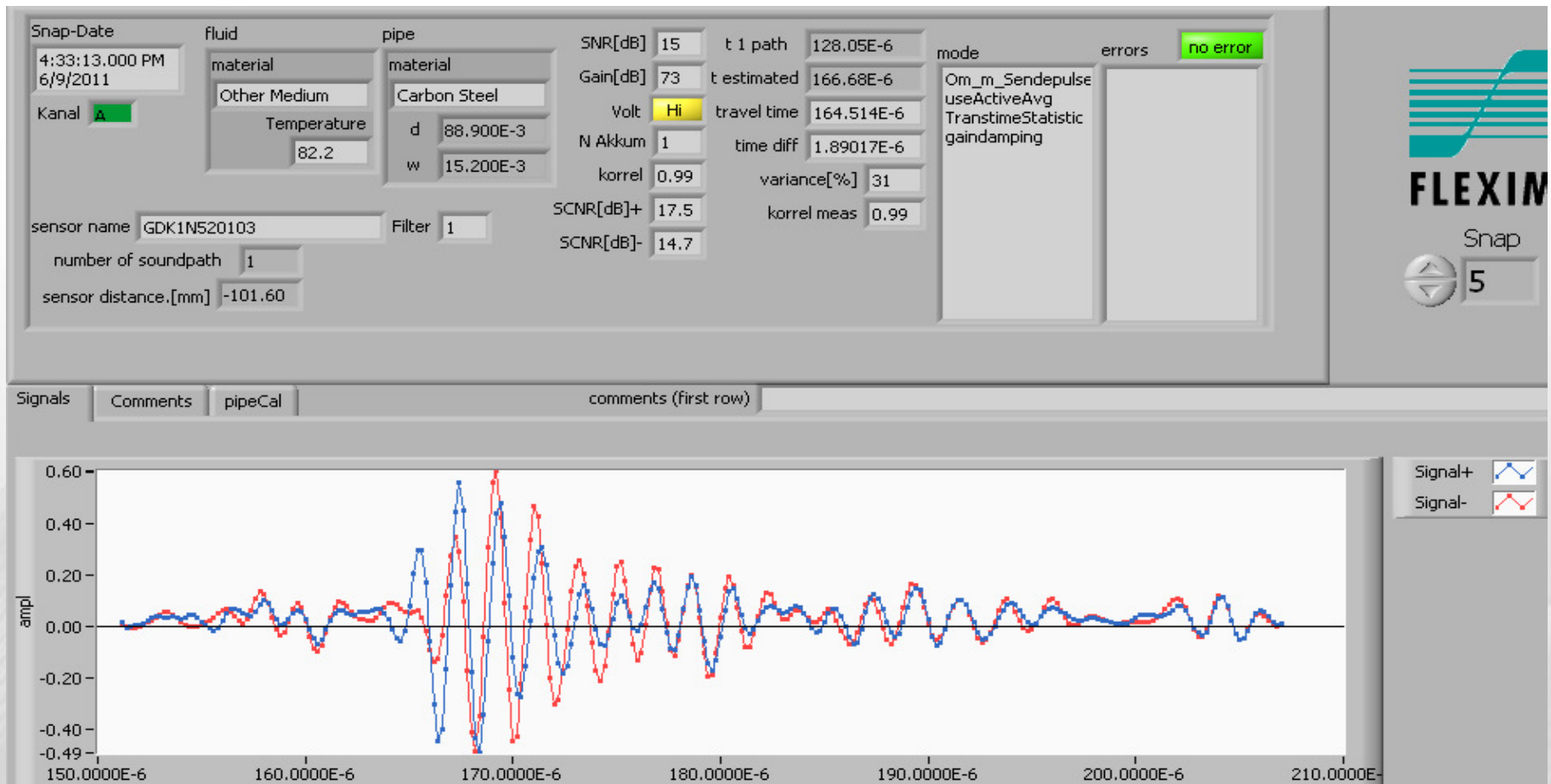


Results from 1st test of Flexim meter at the well head - versus Orifice meter located downstream of separator
Green = Orifice Blue = Flexim



Solution - Performance

The 1st test graphs below are signals taken from the meter using Flexim's Snapview program.

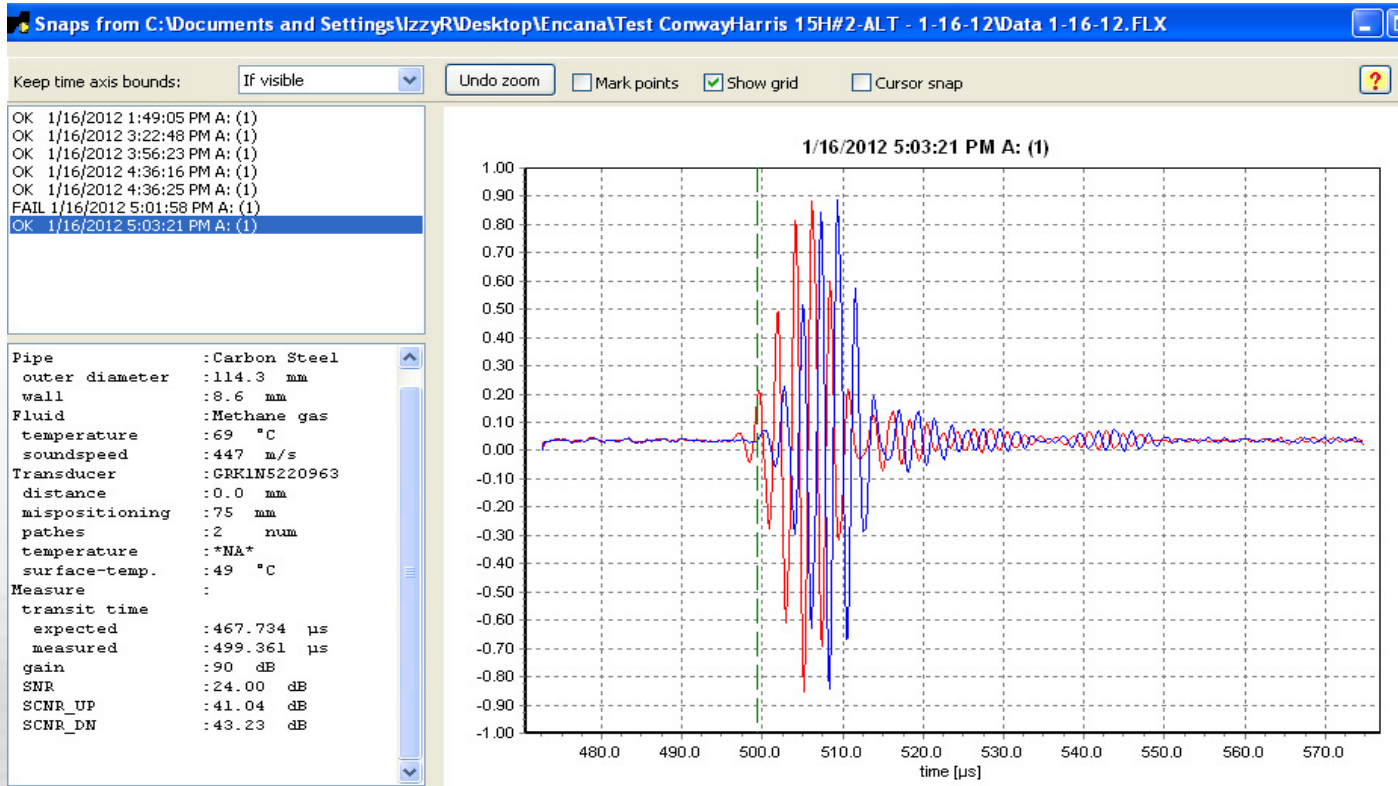


Data from 2nd test Flexim versus Senior Daniels Orifice



Solution - Results

The graph below is the signal taken from the meter.



Test Conclusions: The clamp-on meter has demonstrated the ability to obtain a good signal at the well site (with the pipe dimensions that Encana has standardized on), utilizing permanent epoxy based acoustic dampening. The meter has tested accurate with ~0.5% in 3 tests under various conditions

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- **The #1 Benefit to Encana by showing them the same consistent and repeatable results, (in much more difficult conditions) as the Daniels Orifice meter, is the cost savings on all future well designs.**
- **All well operators are going to multi well pad configurations. Encana by eliminating the need for a separator for each well, they are reducing their time to production from land clearing to full production flow.**
- **Less equipment (separator) requires less day to day maintenance**



Encana multi well head pad