August 14, 2018

Derek Pake Younger
Ursa Operating Company
1050 17th Street, Suite 2400
Denver, Colorado 80265

RE: Diagnostic Fracture Injection Test Analyses
            Tompkins 41AWI-08-07-95
            Cozzette/Corcoran members of the Iles Formation
            Garfield County, CO

Dear Mr. Younger:

Attached is the summary report for the analyses of the Diagnostic Fracture Injection Test (DFIT) performed on the Cozzette/Corcoran completion in the Tompkins 41AWI-08-07-95, Garfield County, CO.

IPT appreciates the opportunity to work with you and Ursa on this project. Please do not hesitate to call if you have any questions or require any additional assistance.

                                    Sincerely,

                                    Ross Johnson, P.E.
                                    Senior Completions Engineer

                                    Neal Hageman, P.E.
                                    Engineering Manager

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1.0 Executive summary

IPT analyzed and evaluated the diagnostic fracture injection test conducted on the Corcoran/Cozzette completion in the Tompkins 41AWI-08-07-95. This analysis was performed to obtain an accurate estimate of reservoir parameters and rock fracturing characteristics. Both the pre-closure and post-closure pressure response suggests average reservoir flow capacity is approximately 111 md-ft. Based upon 56.2 ft net pay, reservoir permeability is calculated to be 1.98 md. Reservoir pressure is calculated to be approximately 3,052 psia (0.422 psi/ft).

The injection test was conducted through the perforations at 7,656' – 959' (7,233' TVD) and was performed by pumping approximately 1,680 gallons of 2% KCl water at about 3.3 bpm. Following the injection, the pressure fall-off was monitored for ~17 hours with a digital surface gauge. The pressure response was analyzed with pre-closure fracture evaluation techniques and post-closure pressure transient analysis (PTA) methods. The results of the analysis are shown in Table 1.

The following are the general conclusions and observations of these evaluations:

- The pre-closure analysis demonstrates a fracture closure pressure of 4,003 psi (0.553 psi/ft) Utilizing this fracture closure pressure, the observed net pressure character is matched with a leakoff coefficient of 0.0015 Ft/Min$^{1/2}$, which corresponds to an average reservoir permeability of 1.99 md across a net pay thickness of 56.2 feet.

- The post-closure PTA analysis suggests the Cozzette/Corcoran interval has moderate reservoir permeability. Based upon the analysis of the late time pressure data trends, average reservoir permeability is estimated to be 1.98 md and reservoir pressure is calculated to be 3,052 psi (0.422 psi/ft pressure gradient).

- After 325 minutes of data collection, surface pressure fell to zero due to the slightly under pressured nature of the formation. The models utilized the first 325 minutes of data due to inaccurate bottomhole pressure calculations after the pressure fell to zero.

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Table 1: Reservoir parameters.

Reservoir Parameter	Injection Test Analyses	
	Pre-Closure Analysis	**Post-Closure Analysis**
Model	Fracture	Radial
Fracture propagation pressure (psi)	4,522	N/A
Propagation pressure gradient (psi/ft)	0.625	N/A
Fracture closure pressure (psi)	4,003	N/A
Closure pressure gradient (psi/ft)	0.553	N/A
Leakoff coefficient (ft/min$^{1/2}$)	0.0015	N/A
Effective reservoir permeability (md)	1.99	1.98
Flow capacity (md-ft)	111.8	111.3
Net pay thickness (ft)	56.2	56.2
Reservoir pressure (psi)	N/A	3,052
Reservoir pressure gradient (psi/ft)	N/A	0.422

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2.0 Discussion of pre-closure analysis of injection test

IPT analyzed and evaluated the pre-closure portion of the pressure response from the fall-off test performed on the Cozzette/Corcoran in the Tompkins 41AWI-08-07-95. This analysis was performed to determine the fracturing mechanics parameters for the Cozzette/Corcoran members of the Iles Formation.

Observations from the pre-closure evaluation are shown below:

- Hydraulic fracture propagation is confirmed by the typical diagnostic plots for an injection/falloff test: semi-log-of-time (Figure 1) and square-root-of-time (Figure 2) as discussed in SPE 29599. The semi-log-of time plot confirms fracture closure has occurred. The square-root-of-time plot determines fracture closure pressure to be at approximately 13 minutes with a calculated fracture closure pressure of 4,003 psi (0.553 psi/ft).

- The G-Function plot (Figure 3) also suggests fracture closure pressure to be at approximately 4,003 psi (0.553 psi/ft).

- The bottom hole pressure response and net pressure history match are shown in Figure 4. Utilizing the fracture closure pressure determined from the injection test, the observed net pressure character is matched with a leakoff coefficient of 0.0015 ft/min$^{1/2}$. This relates to a reservoir permeability of 1.99 md utilizing a net pay thickness of 56.2 feet.

- The fracture dimensions created during the subject injection test are shown in Figure 5.

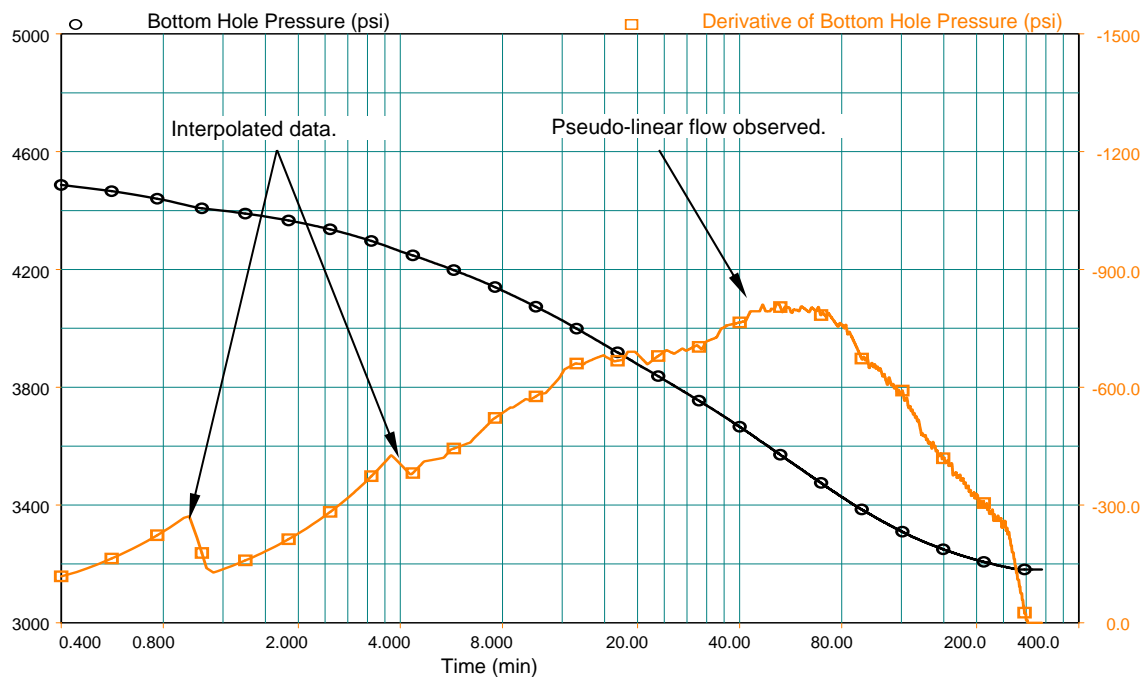The following are the graphical presentations used in the analysis:

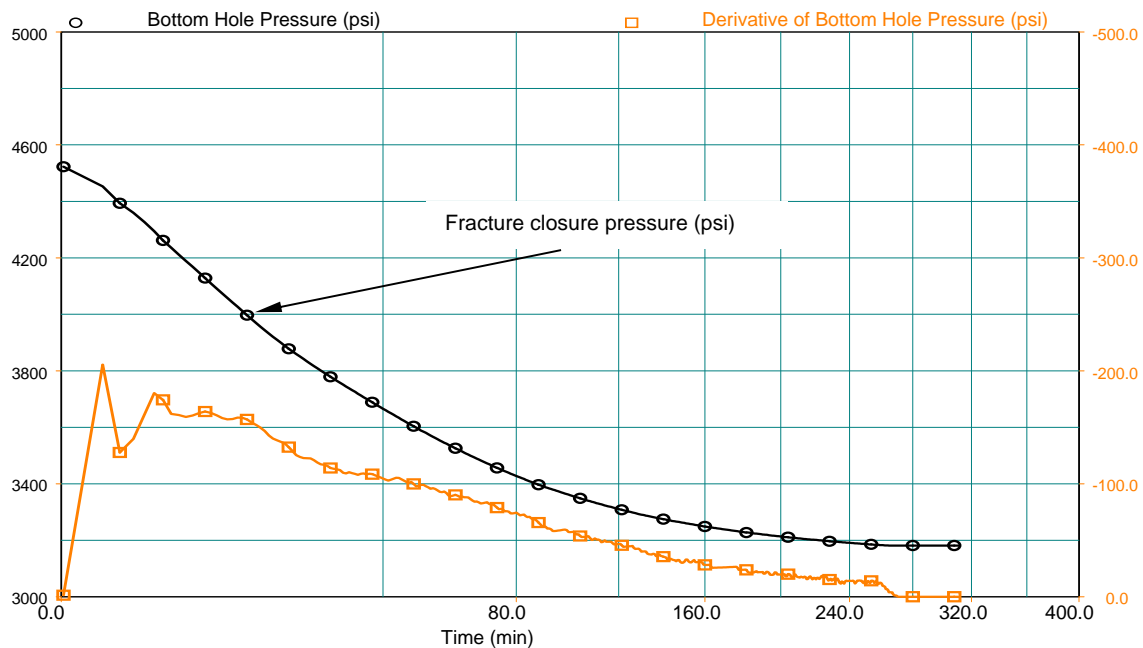**Figure 1**: Injection test pressure falloff analysis, semi-log-of-time plot.
Figure 2: Injection test pressure falloff analysis, square-root-of-time plot.
Figure 3: Injection test pressure falloff analysis, G-Function plot.
Figure 4: Injection test data and net pressure history match.
Figure 5: Profile of created fracture.

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Figure 1: Injection test pressure falloff analysis, semi-log-of-time plot.

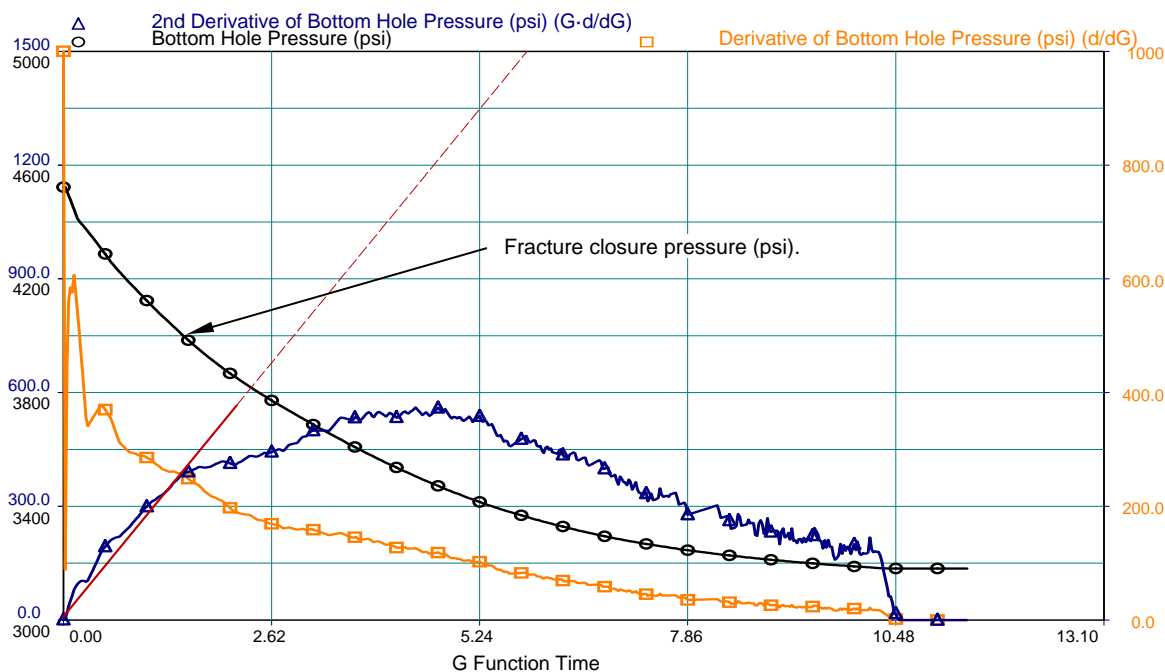**Figure 2:** Injection test pressure falloff analysis, square-root-of-time plot.
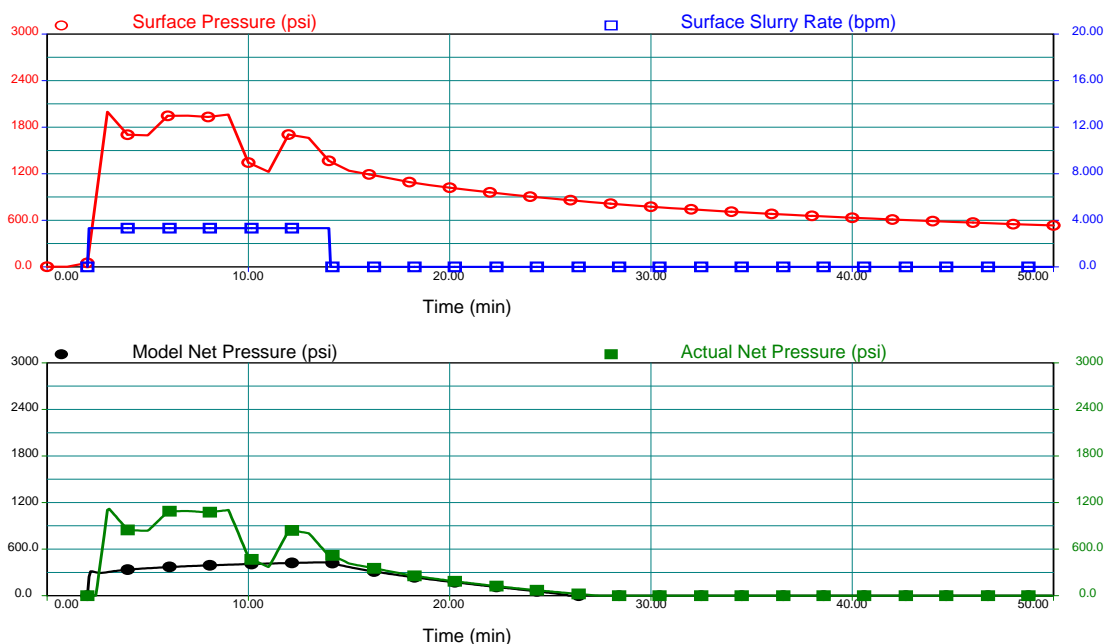
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Figure 3: Injection test pressure falloff analysis, G-Function plot.

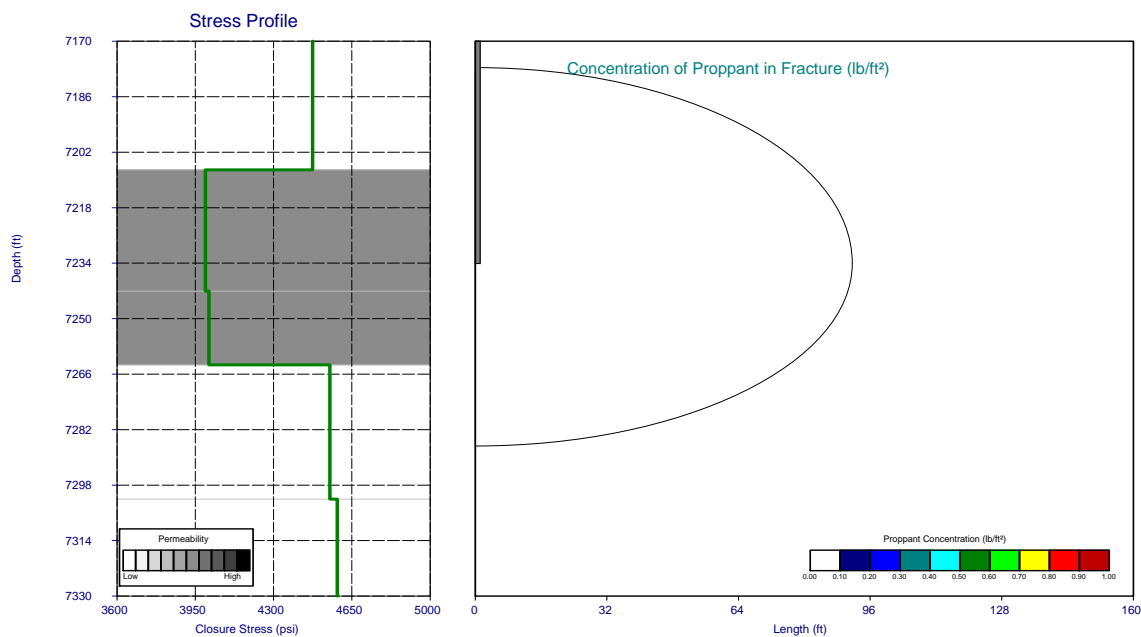**Figure 4**: Injection test data and net pressure history match.

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Figure 5: Profile of created fracture.

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3.0 Review of post-closure analysis of injection test

The reservoir parameters calculated from the surface pressure fall-off analysis (PTA) of the injection/falloff test are shown in Table 1.

The following figures are used in the analysis:

Figure 6: Cartesian plot of surface and bottom-hole pressure.
Figure 7: Diagnostic log-log plot.
Figure 8: Model match of pressure history.

Observations from the pressure fall-off (PTA) evaluation are shown below:

- The PTA log-log diagnostic plot (Figure 7) indicates several changes in flow regime: 1.) Pre-fracture closure early time period demonstrates an open fracture response. 2.) A post-fracture closure transition period. 3.) Test reaches infinite acting radial flow.

- The type curve match of the late-time pressure trends (Figure 7) suggests a reservoir flow capacity of 111 md-ft. Based upon 56.2 ft net pay, reservoir permeability is calculated to be 1.98 md.

- Based upon the late time pressure trends (Figures 7 and 8), current reservoir pressure is approximately 3,052 psia (0.422 psi/ft).
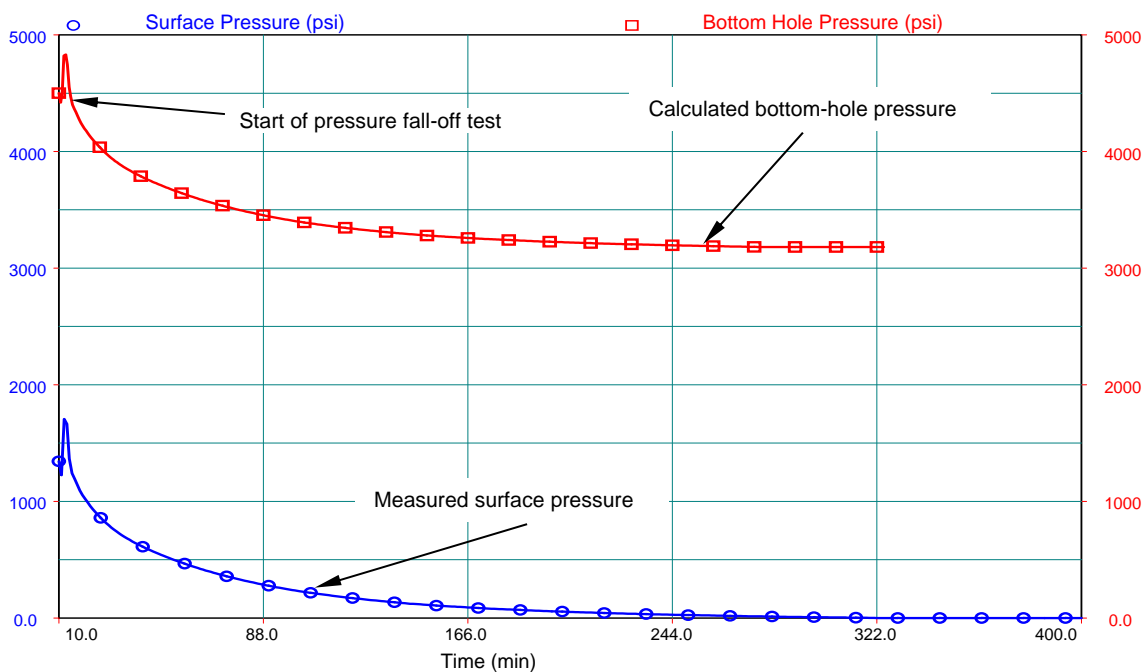
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Figure 6: Cartesian plot of surface pressure and bottom-hole pressure.

Figure 7: Diagnostic log-log plot.

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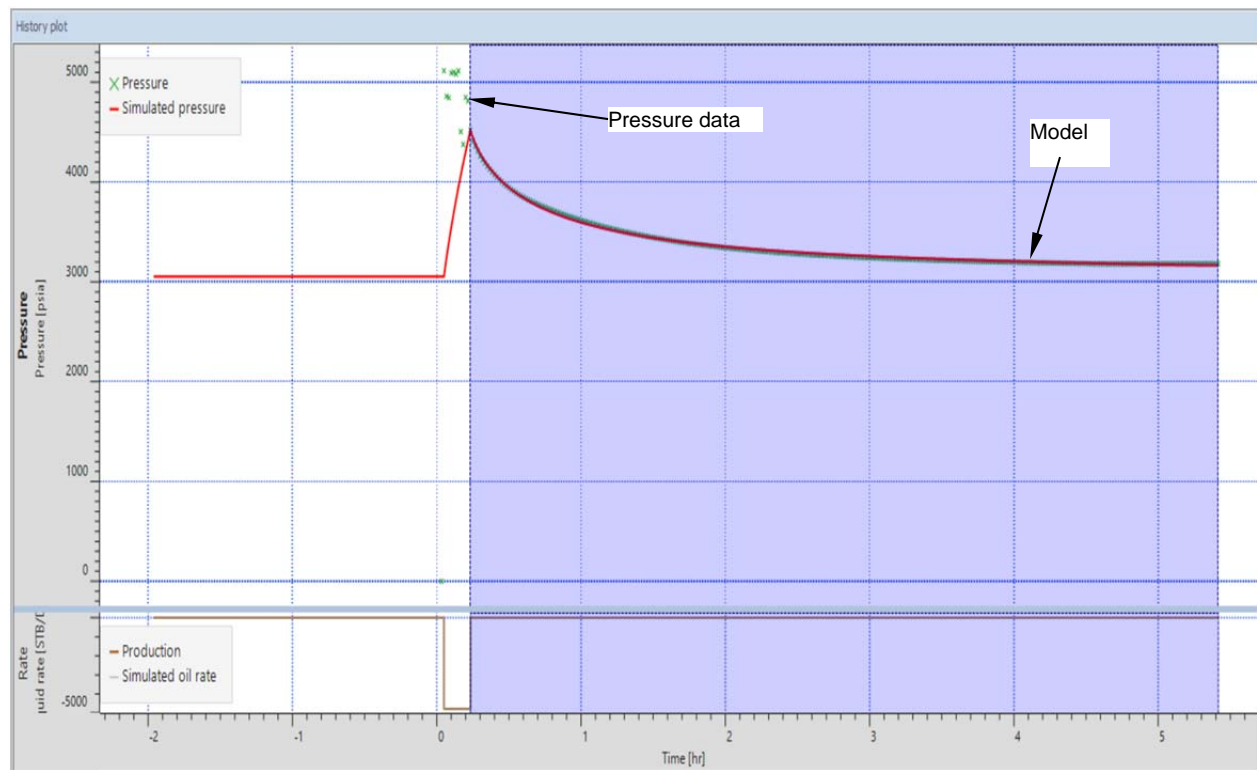
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Figure 8: Model match of pressure history.