

Company: CDEX

**C0009A Kumanonada, Offshore Kii Peninsula
MDT Single Probe Pressure Test
MDT Dual Packer Stress Test**

Khong Chee Kin
DCS Schlumberger North Asia
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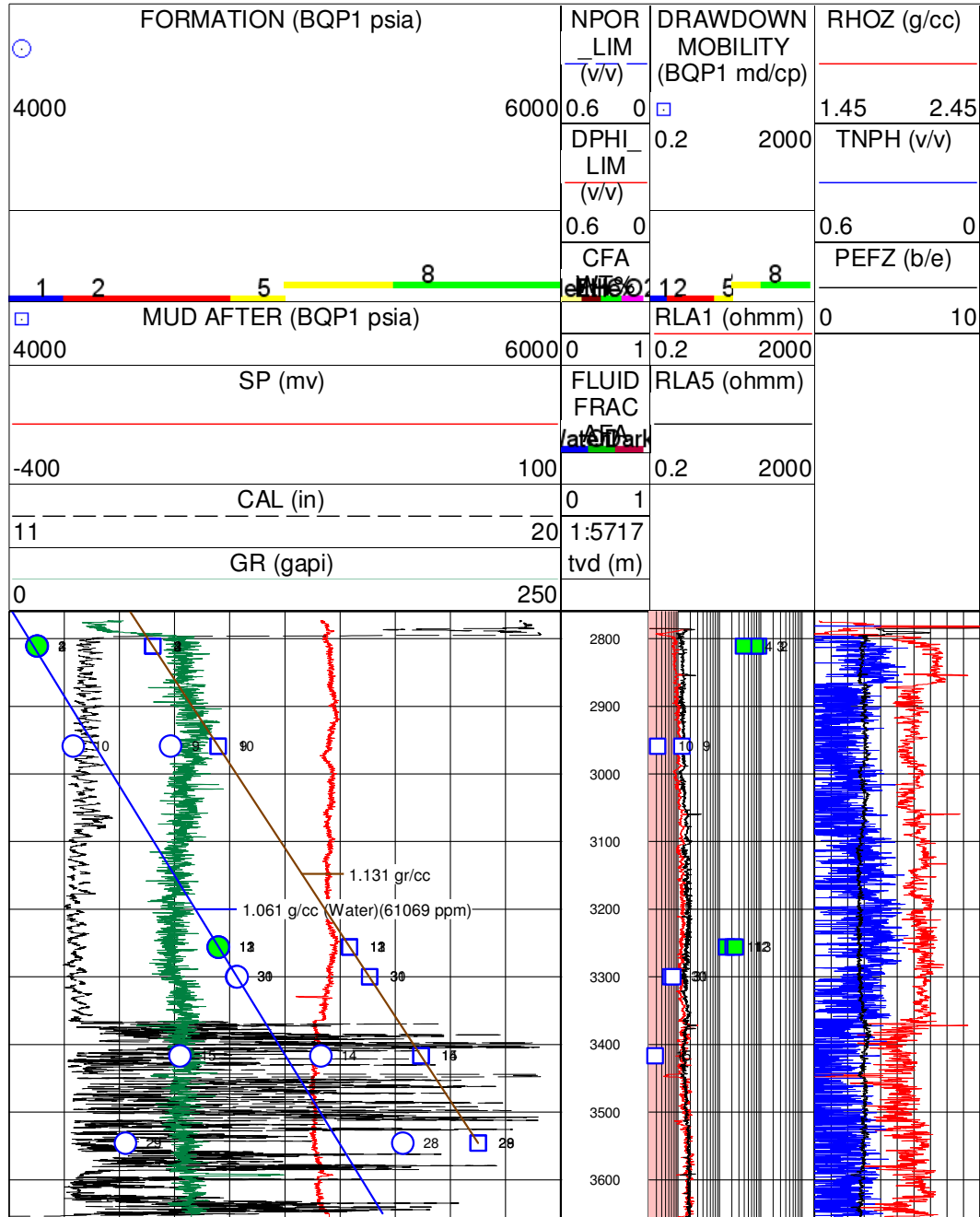
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1. MDT Single Probe Pressure Test

1.1 PDPlot

Pressure Depth Plot

Schlumberger



C0009A - Kumanonada, Offshore Kii Peninsula

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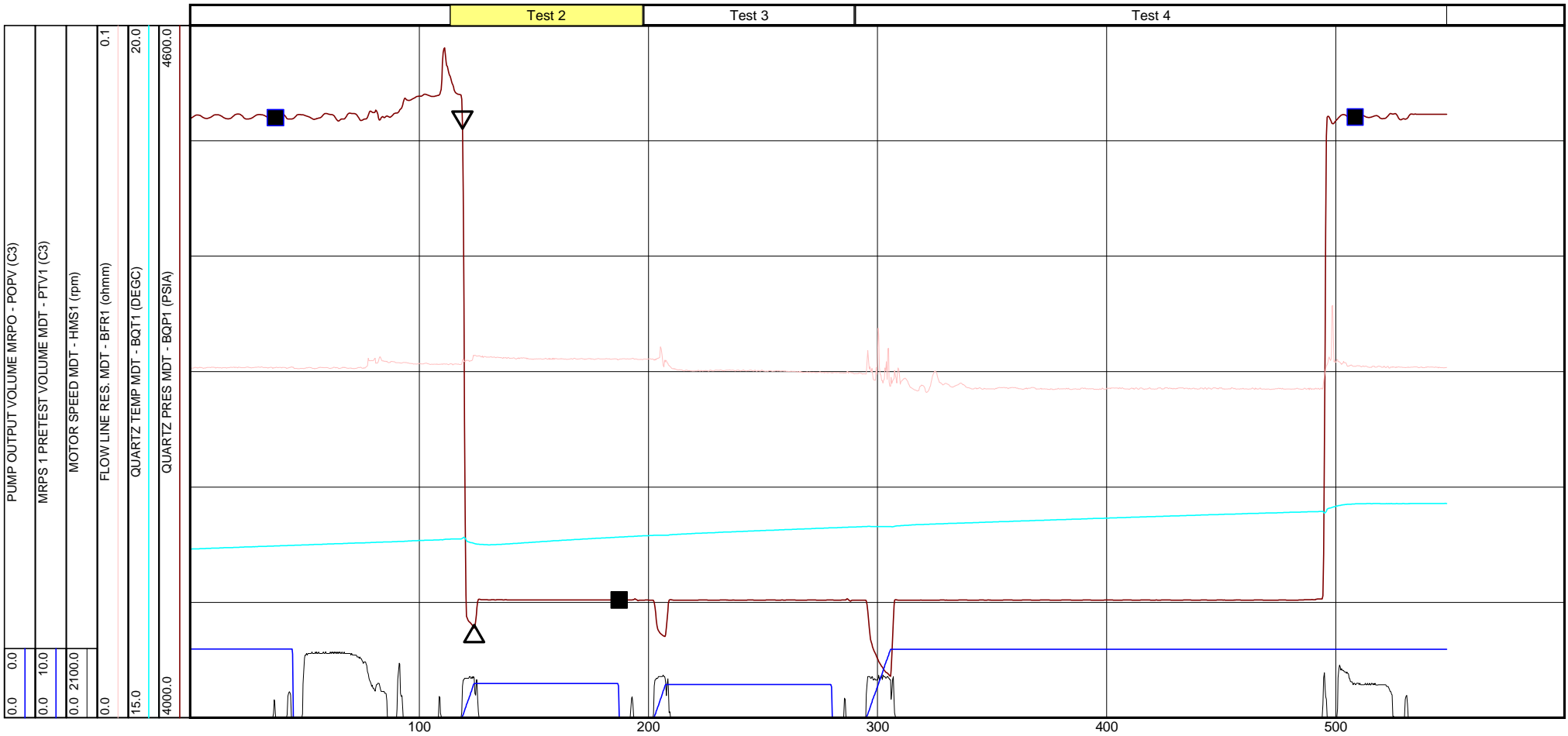
1.2 MDT Single Probe Pressure Test Table

File No.	Test No.	Test MD	Test TVD	Last Read Buildup Pressure	Drawdown Mobility	Mud Before	Mud After	Spherical Mobility	Horner Mobility	Temp	Pretest Volume	Pretest Time	Pretest Flowrate
		m	m	psia	md/cp	psia	psia	md/cp	md.m/cp	degC	cc	s	cc/s
59	2	2811.02	2811.02	4102.21	89.99	4520.15	4520.66			17.83	4.97	5.1	0.97
59	3	2811.02	2811.02	4102.13	75.25	4520.15	4520.66			17.62	4.67	4.8	0.97
59	4	2811.02	2811.02	4102.42	38.55	4520.15	4520.66	30.34		17.47	9.92	10.8	0.92
61	9	2959.02	2959.02	4508.72	1.24	4761.94	4758.52		0.03	19.79	4.97	7.8	0.64
61	10	2959.02	2959.02	4502.66	0.32	4761.94	4758.52		0.02	19.94	4.82	12	0.4
65	11	3256.06	3256.06	4759.64	14.87	5235.01	5234.96			27.01	4.8	7.5	0.64
65	12	3256.06	3256.06	4759.54	21.63	5235.01	5234.96		33.38	27.13	9.72	11.7	0.83
65	13	3256.06	3256.06	4759.5	24.16	5235.01	5234.96			27.27	4.87	4.2	1.16
78	30	3300.03	3300.03	4825.1	0.66	5304.4	5307.68			31.15	4.93	7.8	0.63
78	31	3300.03	3300.03	4825.65	0.75	5304.4	5307.68		0.16	30.92	2.9	6.9	0.42
67	14	3416.99	3416.99	5130.89	0.19	5491.13	5493.57			27.78	4.83	7.5	0.64
67	15	3416.99	3416.99	5022.18	0.28	5491.13	5493.57		0.02	27.88	4.84	11.1	0.44
75	28	3545.98	3545.98	5428.09	0.06	5701.61	5701.13			33.23	4.91	6	0.82
75	29	3545.98	3545.98	5185.5	0.1	5701.61	5701.13		0.02	33.1	4.94	11.7	0.42

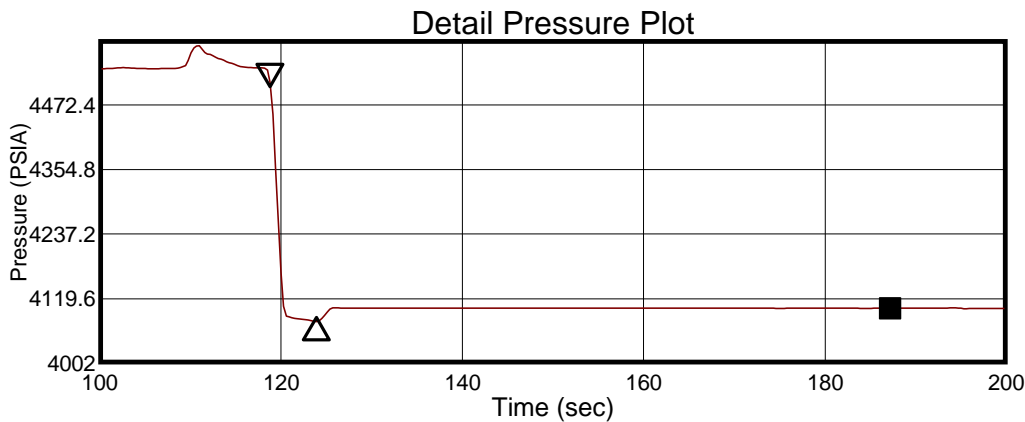
1.3 MDT Single Probe Polaris Pretest Interpretation

Pressure Vs Time Plot : File 59 Test 2 2811.02 M (TVD)

C0009A



Detail Pressure Plot



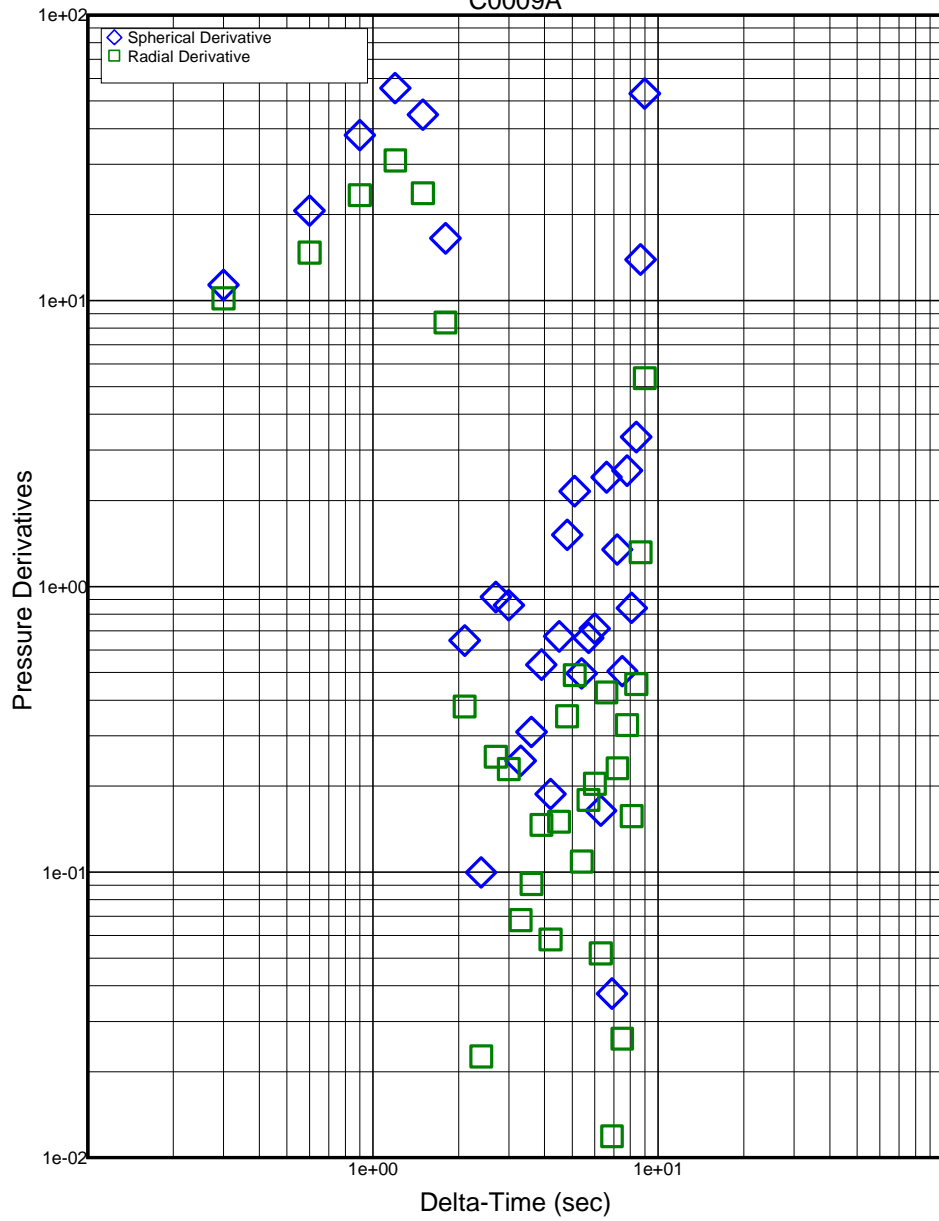
Time (sec)

- Mud Before
- ▽ Drawdown Start
- △ Buildup Start
- End Buildup
- Mud After

Tool Type	MDT
Test Type	Normal Pretest
Packer	Large-Diameter Probe
Gauge	BQP1
Formation Pressure	4102.21 PSIA
Last Read	4102.21 PSIA
Drawdown Mobility	89.99 md/cp (3.4 of 4.97 cc)
Mud Pressure Before	4520.15 PSIA
Mud Pressure After	4520.66 PSIA
Temperature Before/After	17.83 DEGC / 17.65 DEGC
Pretest Rate/Volume	0.97 c3/s / 4.97 cc

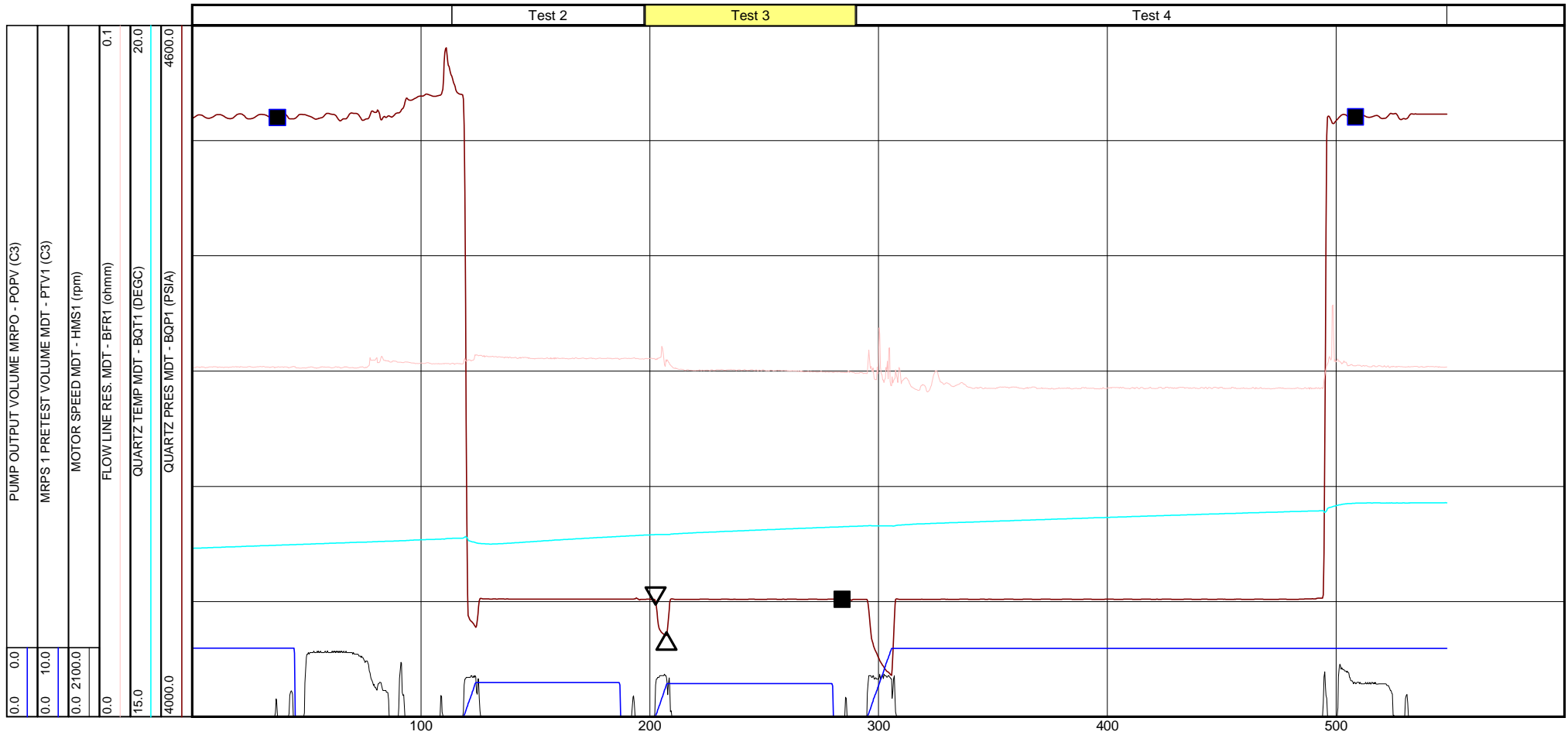
Flow Regime Identification Plot : File 59 Test 2 2811.02 M (TVD)

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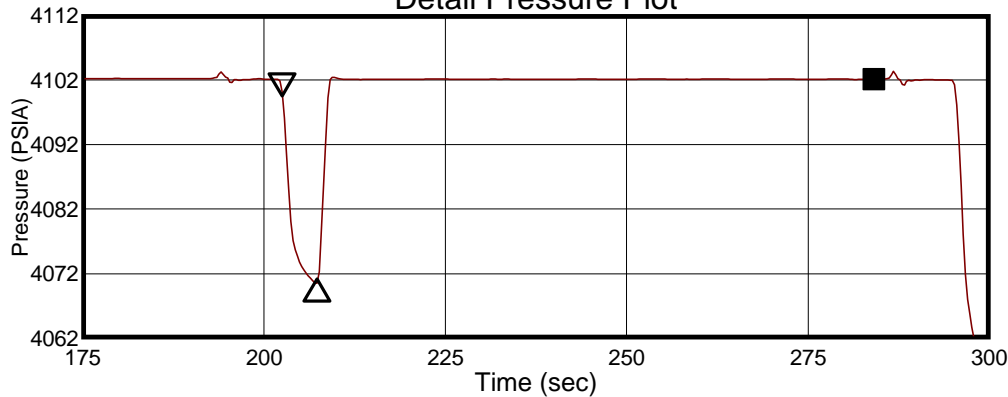


Pressure Vs Time Plot : File 59 Test 3 2811.02 M (TVD)

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Detail Pressure Plot



Time (sec)

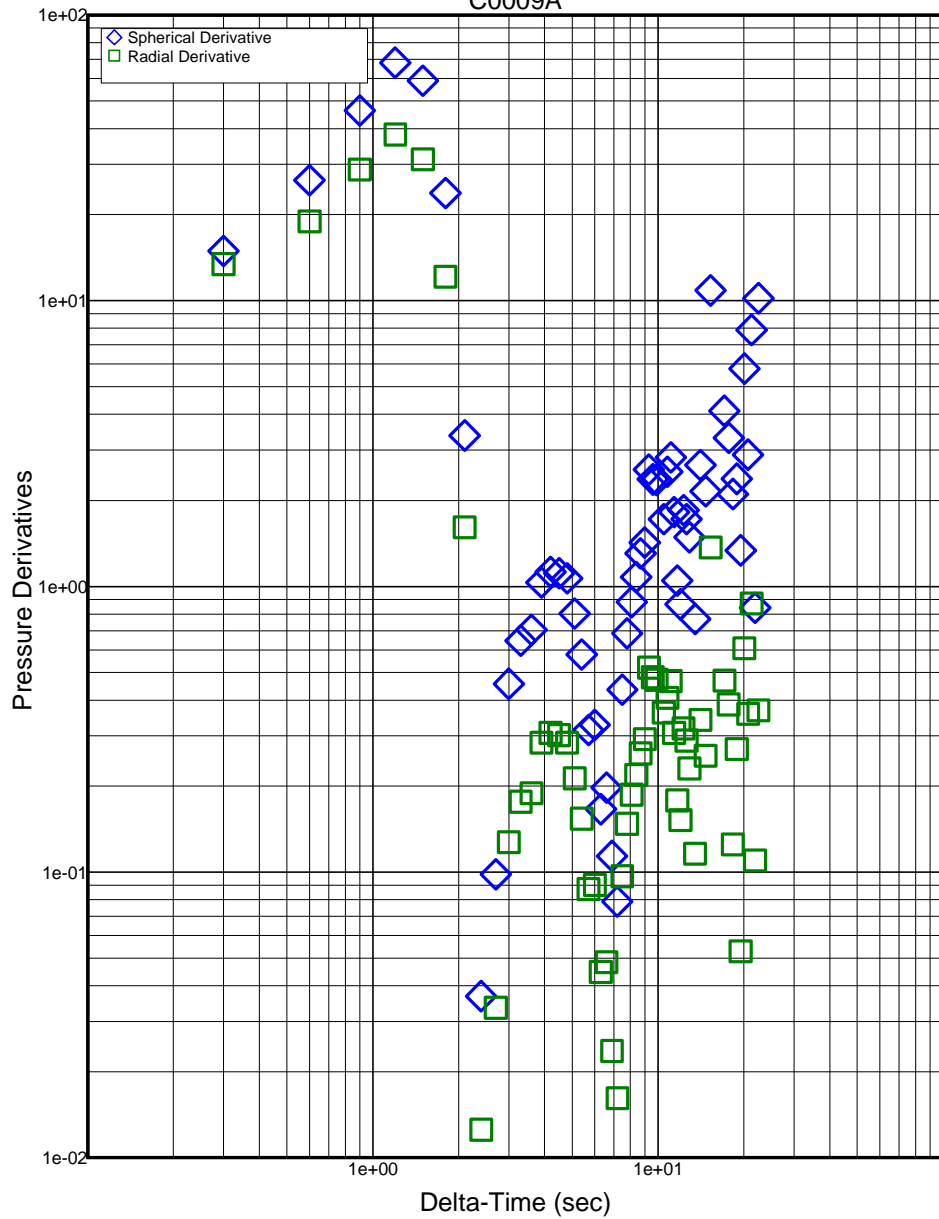
- Mud Before
- ▽ Drawdown Start
- △ Buildup Start
- End Buildup
- Mud After

Tool Type MDT
 Test Type Normal Pretest
 Packer Large-Diameter Probe
 Gauge BQP1
 Formation Pressure 4102.13 PSIA
 Last Read 4102.13 PSIA
 Drawdown Mobility 75.252 md/cp (4.67 cc)

Mud Pressure Before 4520.15 PSIA
 Mud Pressure After 4520.66 PSIA
 Temperature Before/After 17.62 DEGC / 17.51 DEGC
 Pretest Rate/Volume 0.97 c3/s / 4.67 cc

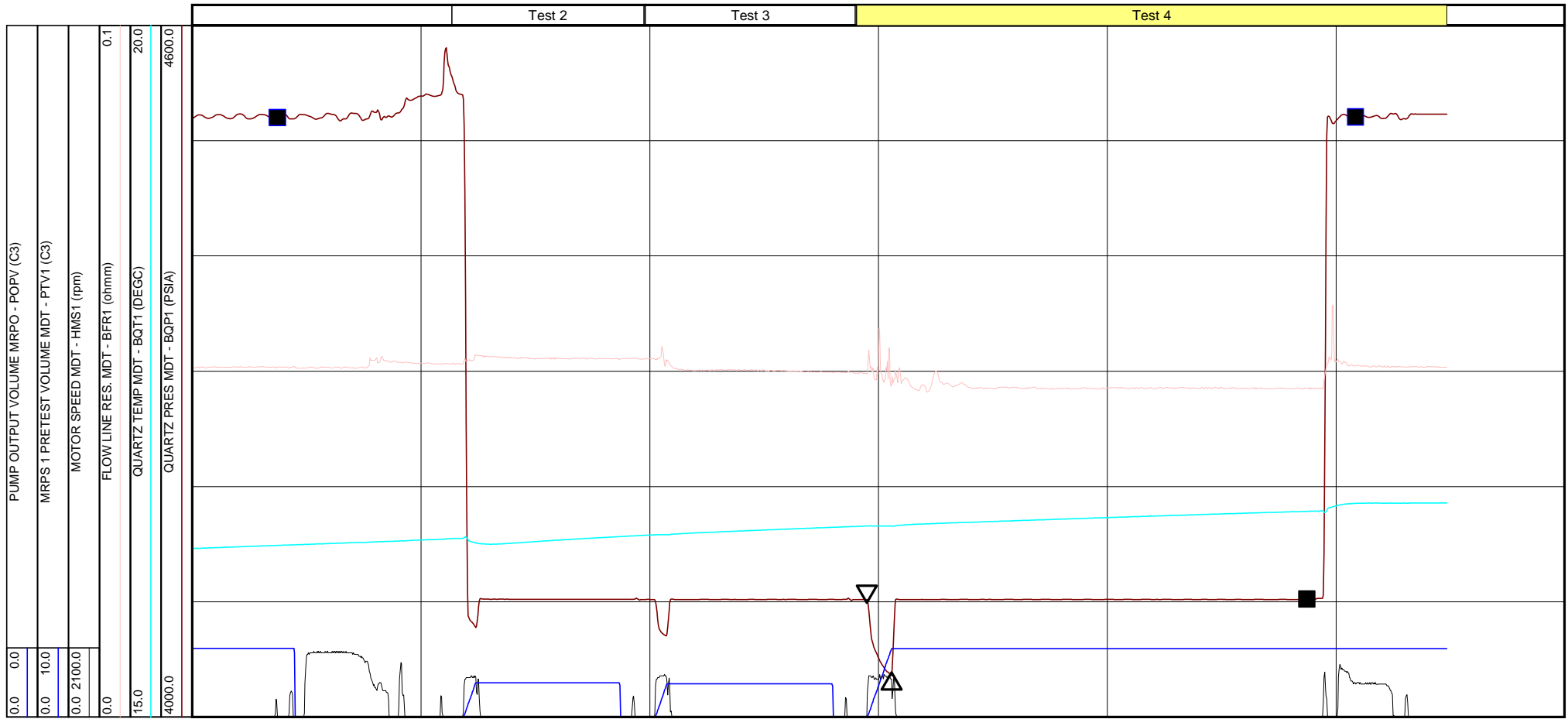
Flow Regime Identification Plot : File 59 Test 3 2811.02 M (TVD)

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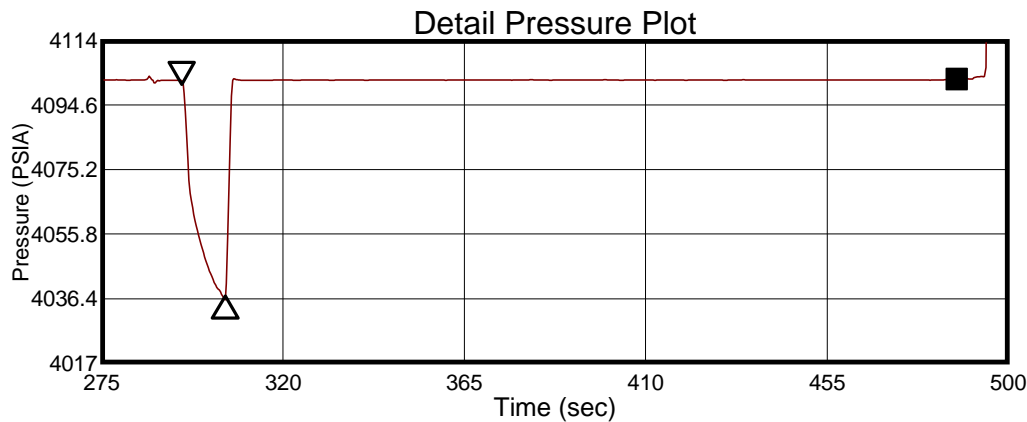


Pressure Vs Time Plot : File 59 Test 4 2811.02 M (TVD)

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Detail Pressure Plot



Time (sec)

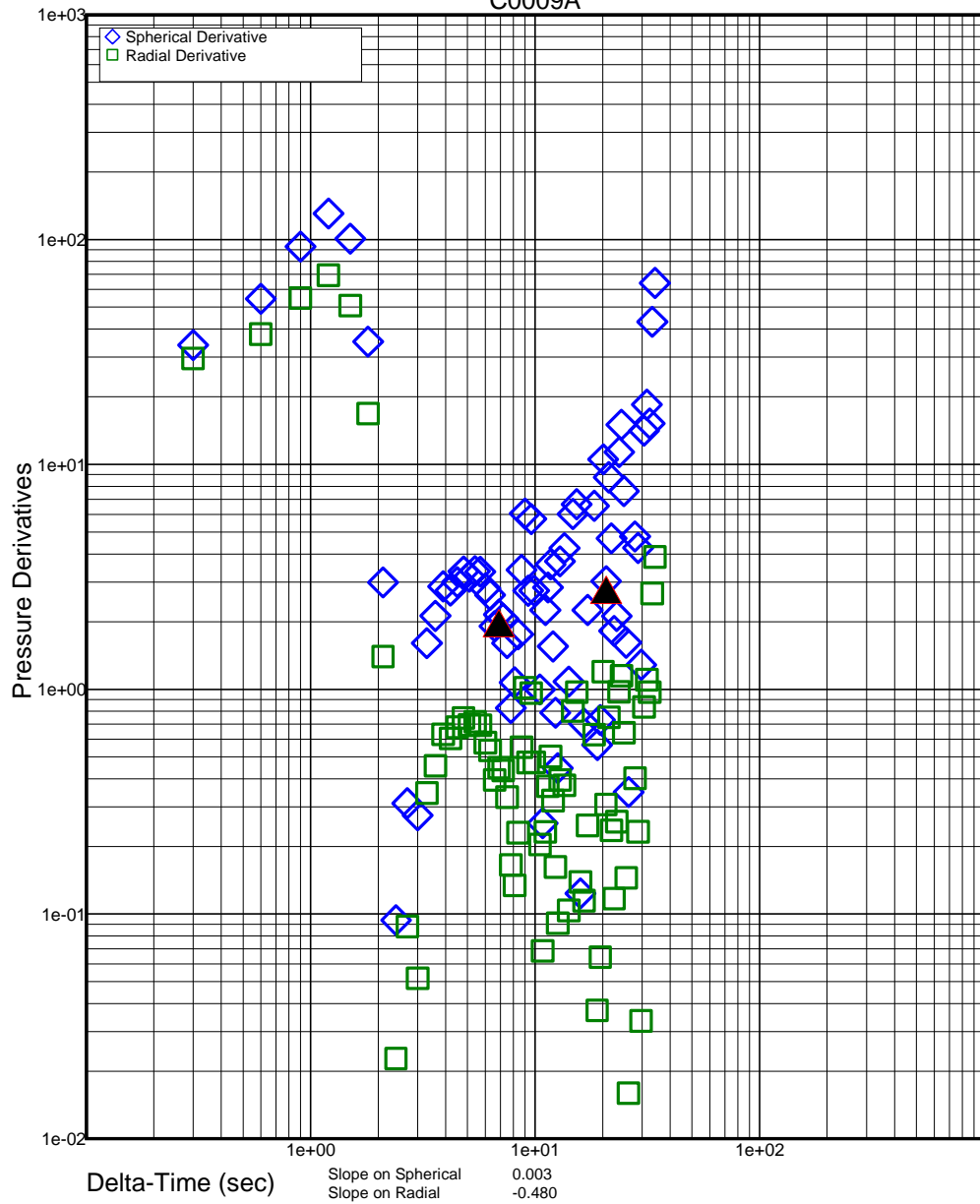
- Mud Before
- ▽ Drawdown Start
- △ Buildup Start
- End Buildup
- Mud After

Tool Type MDT
 Test Type Normal Pretest
 Packer Large-Diameter Probe
 Gauge BQP1
 Formation Pressure 4102.14 PSIA
 Last Read 4102.42 PSIA
 Drawdown Mobility 38.546 md/cp (9.92 cc)

Mud Pressure Before 4520.15 PSIA
 Mud Pressure After 4520.66 PSIA
 Temperature Before/After 17.47 DEGC / 17.37 DEGC
 Pretest Rate/Volume 0.92 c3/s / 9.92 cc

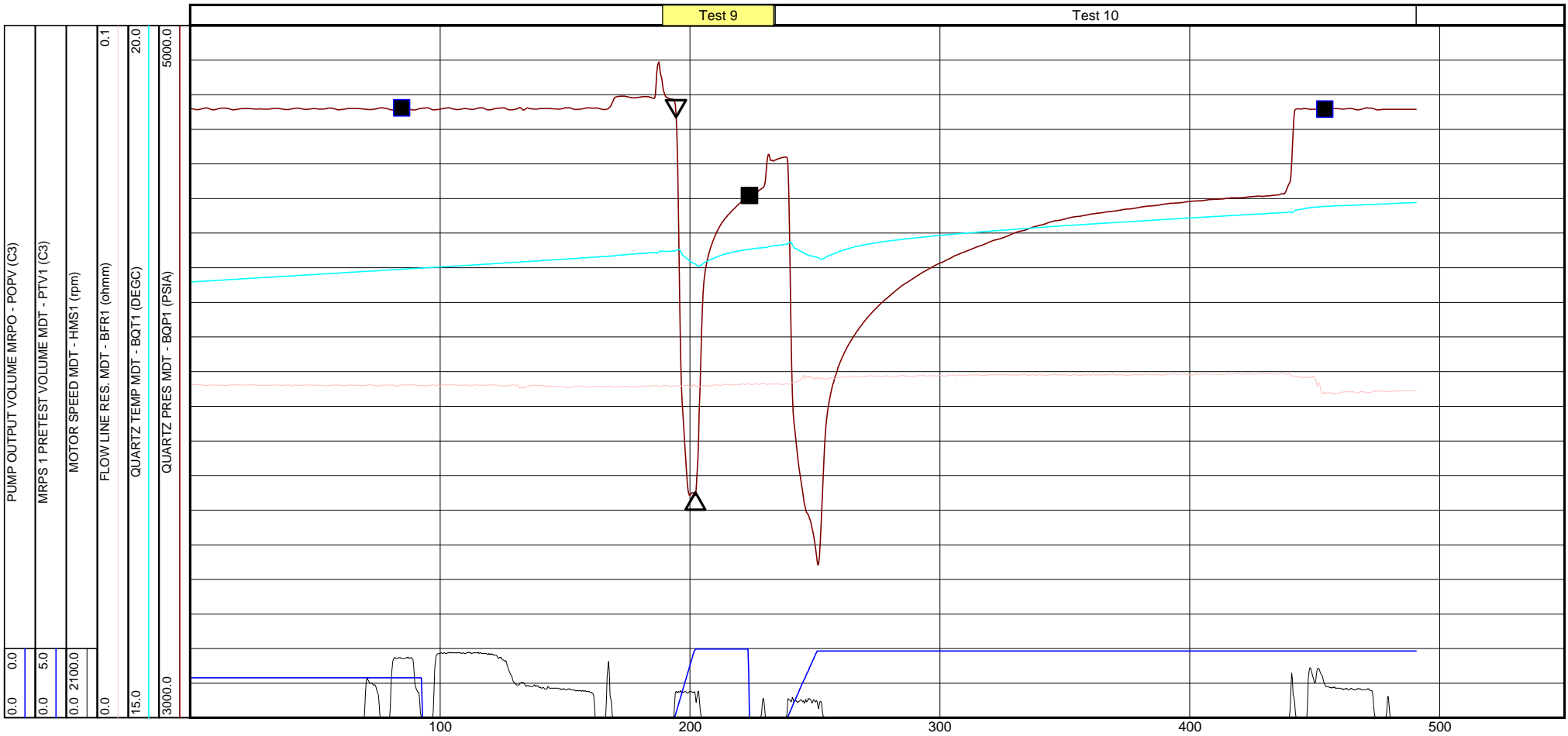
Flow Regime Identification Plot : File 59 Test 4 2811.02 M (TVD)

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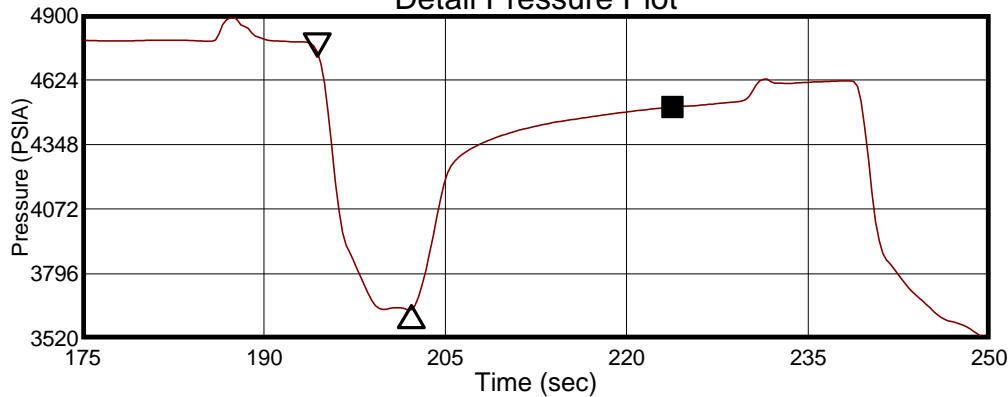


Pressure Vs Time Plot : File 61 Test 9 2959.02 M (TVD)

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Detail Pressure Plot



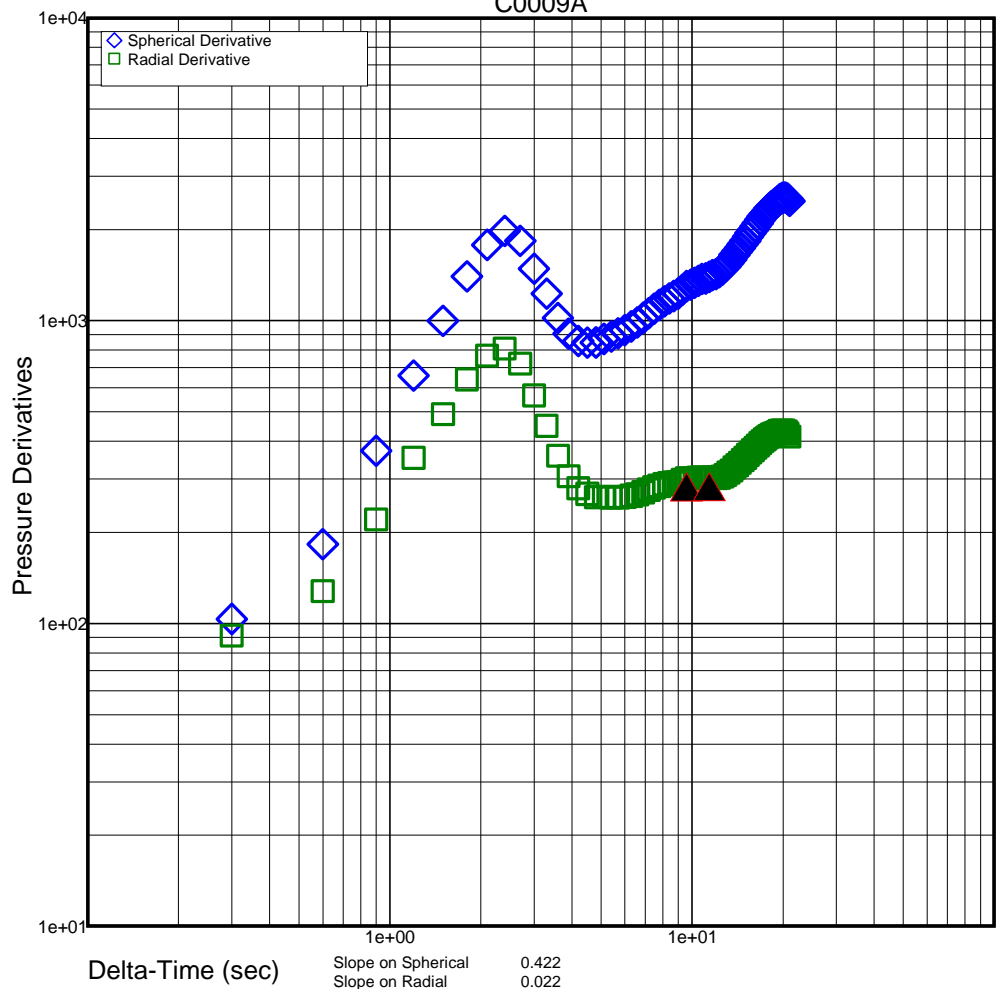
Time (sec)

- Mud Before
- ▽ Drawdown Start
- △ Buildup Start
- End Buildup
- Mud After

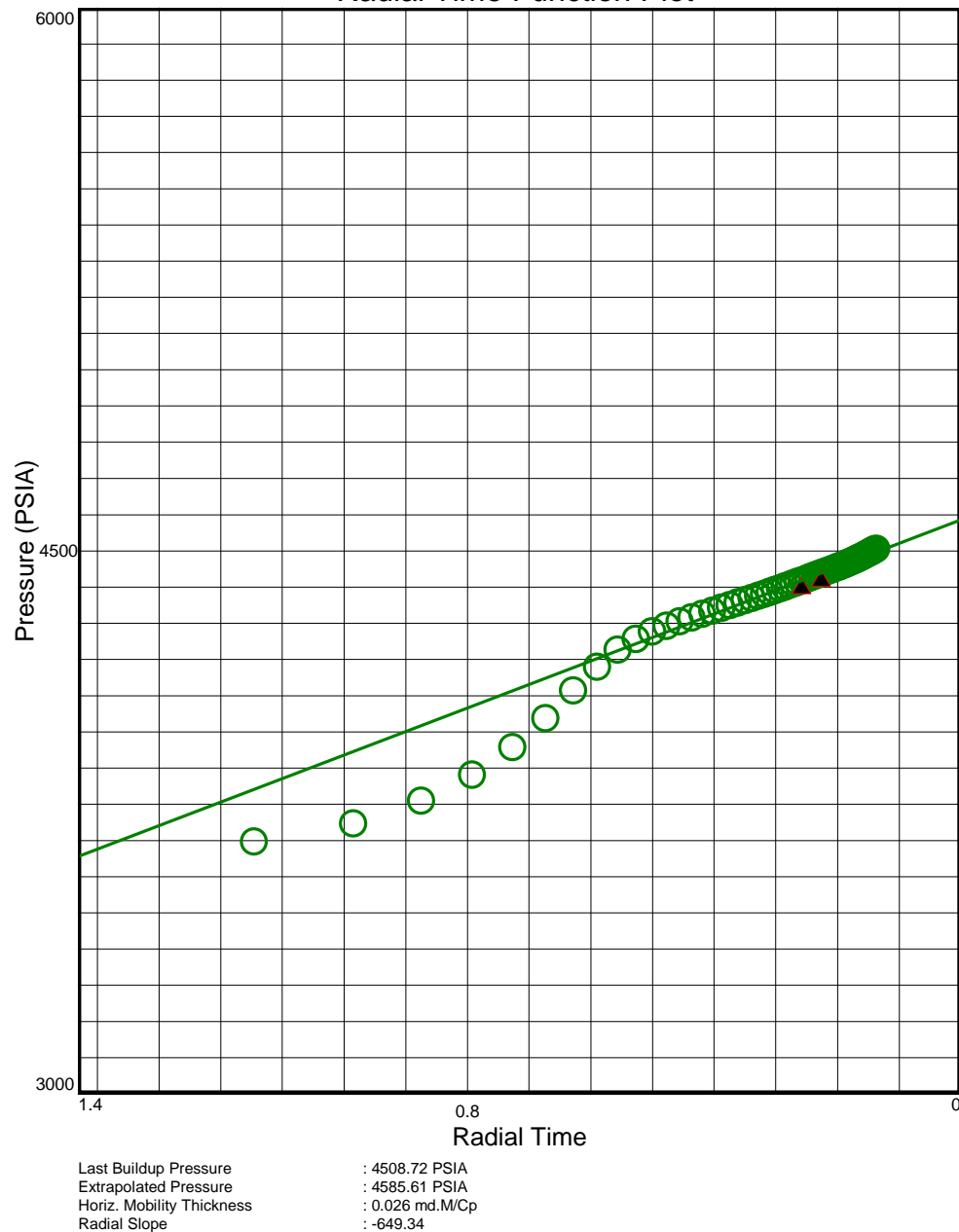
Tool Type	MDT
Test Type	Normal Pretest
Packer	Large-Diameter Probe
Gauge	BQP1
Formation Pressure	4585.61 PSIA
Last Read	4508.72 PSIA
Drawdown Mobility	1.237 md/cp (4.22 of 4.97 cc)
Mud Pressure Before	4761.94 PSIA
Mud Pressure After	4758.52 PSIA
Temperature Before/After	19.79 DEGC / 19.99 DEGC
Pretest Rate/Volume	0.64 c3/s / 4.97 cc

Flow Regime Identification Plot : File 61 Test 9 2959.02 M (TVD)

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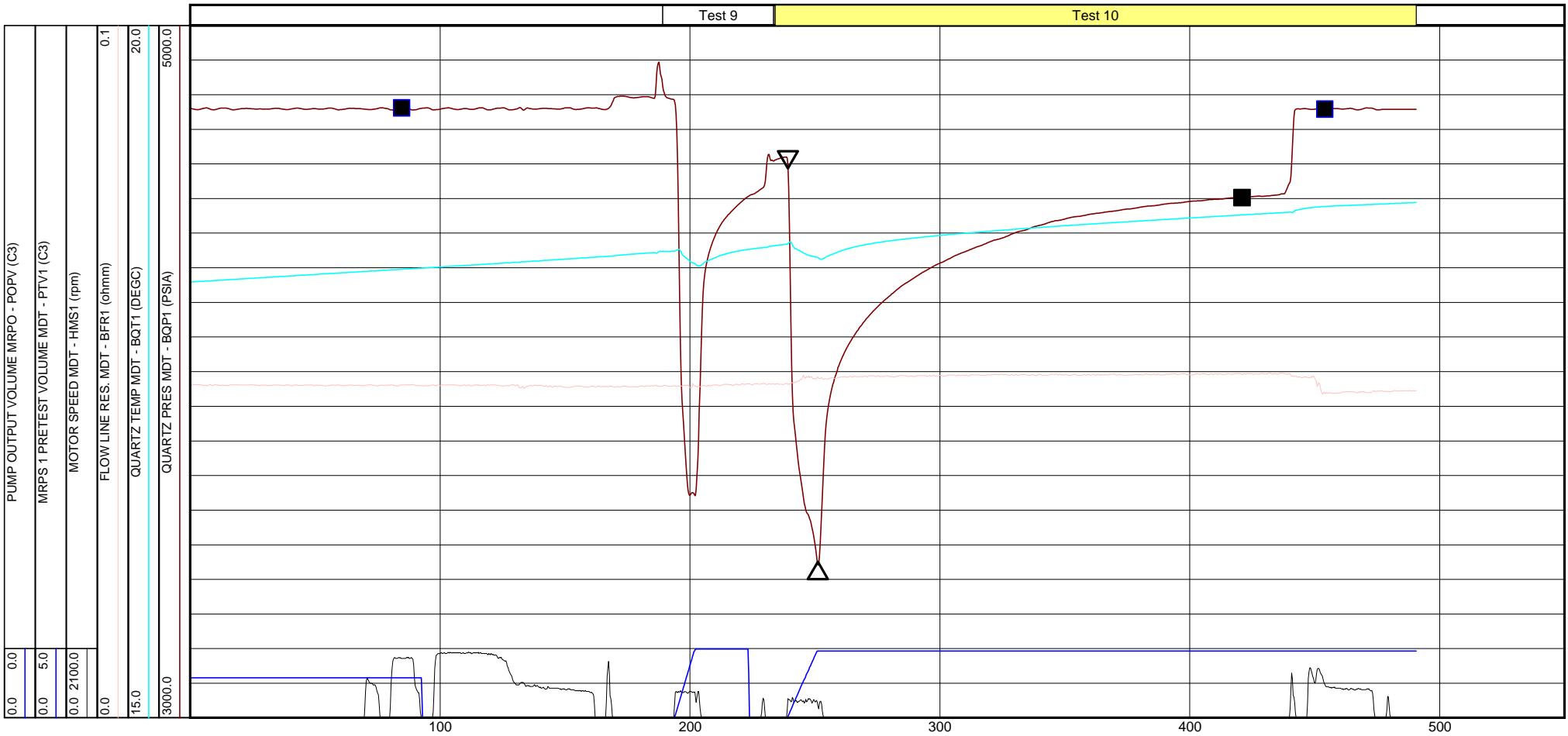


Radial Time Function Plot

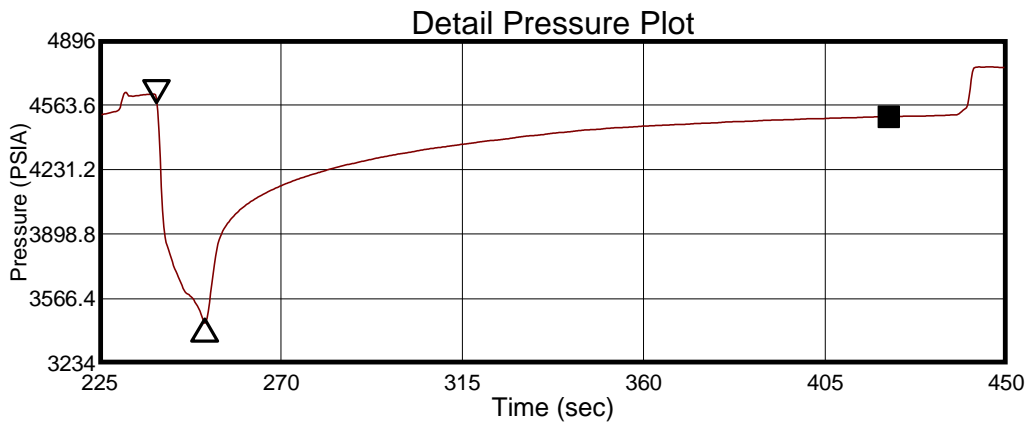


Pressure Vs Time Plot : File 61 Test 10 2959.02 M (TVD)

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Detail Pressure Plot



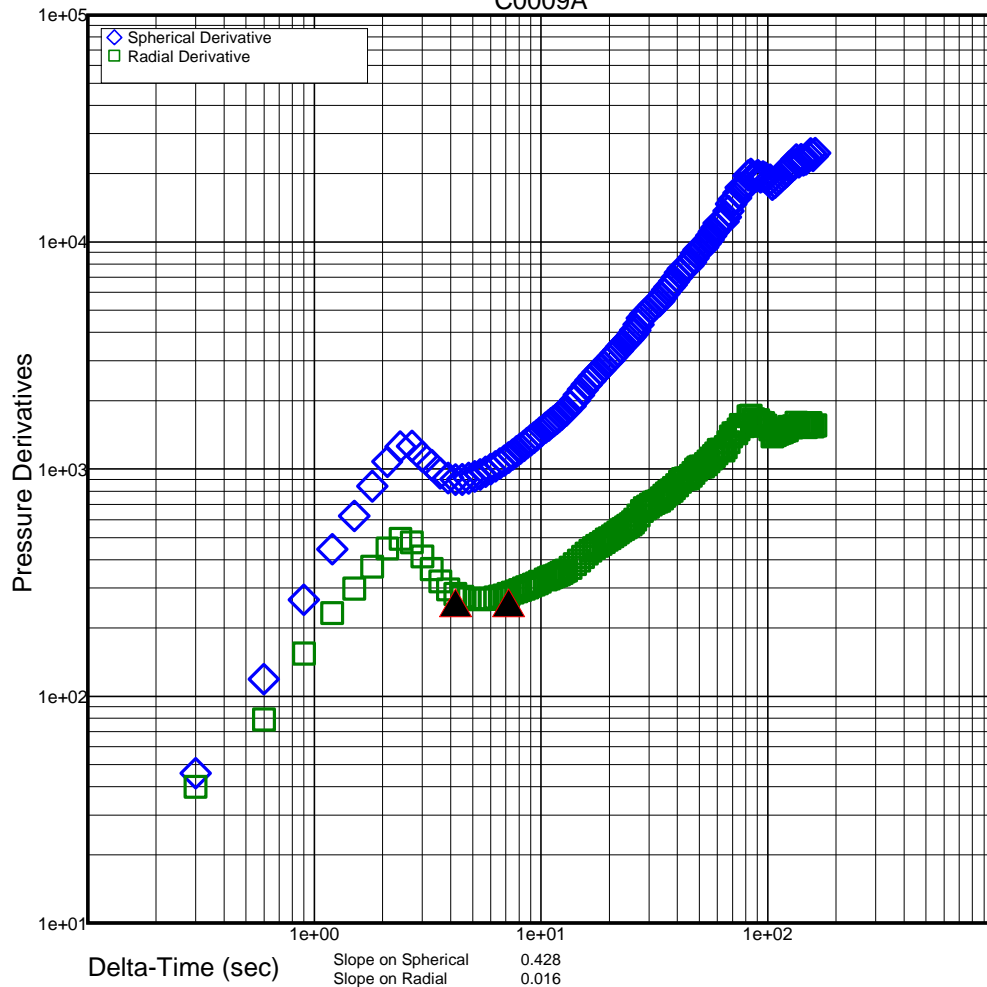
Time (sec)

- Mud Before
- ▽ Drawdown Start
- △ Buildup Start
- End Buildup
- Mud After

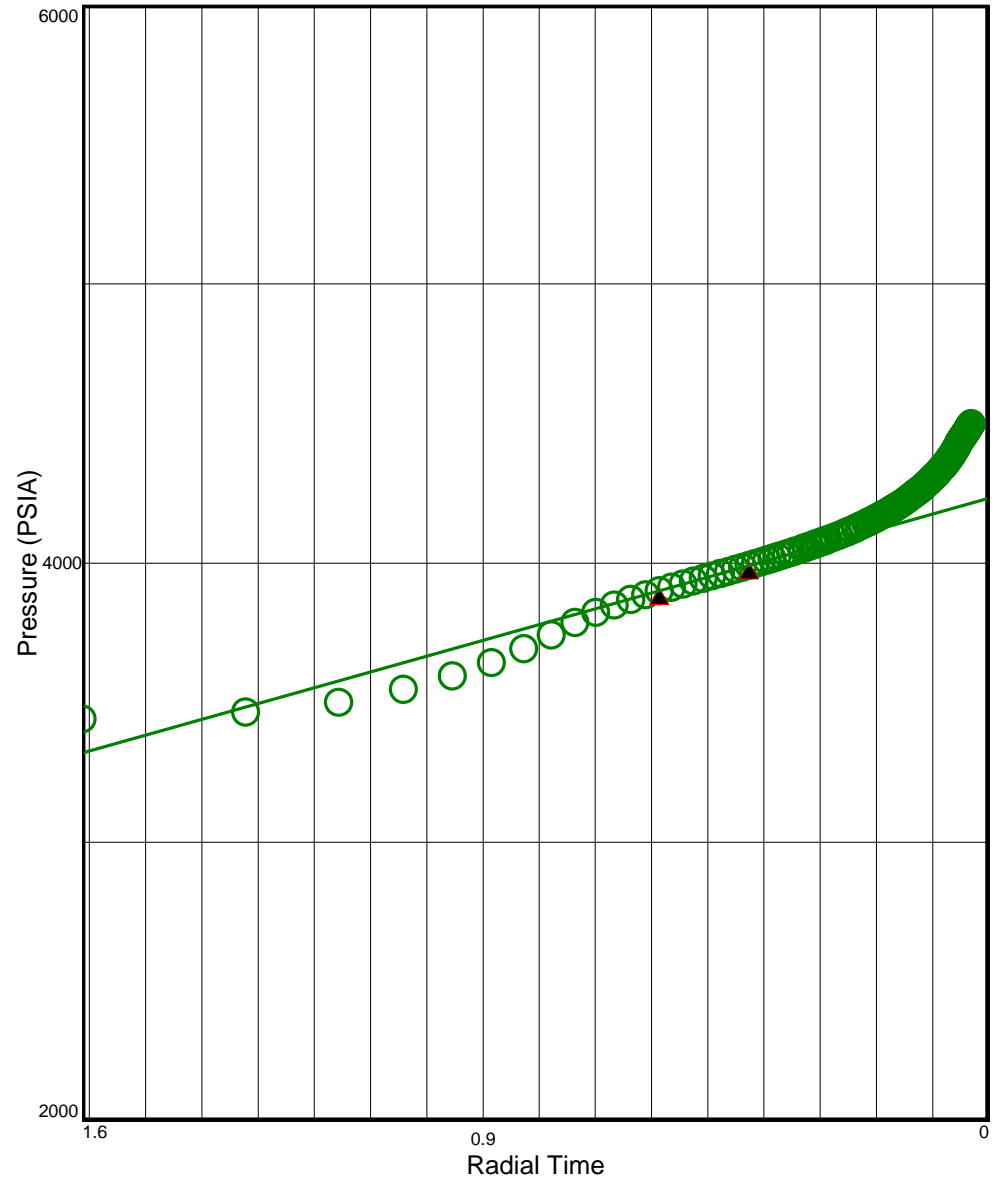
Tool Type	MDT
Test Type	Limited Drawdown
Packer	Large-Diameter Probe
Gauge	BQP1
Formation Pressure	4232.93 PSIA
Last Read	4502.66 PSIA
Drawdown Mobility	0.317 md/cp (4.6 of 4.82 cc)
Mud Pressure Before	4761.94 PSIA
Mud Pressure After	4758.52 PSIA
Temperature Before/After	19.94 DEGC / 20.25 DEGC
Pretest Rate/Volume	0.4 c3/s / 4.82 cc

Flow Regime Identification Plot : File 61 Test 10 2959.02 M (TVD)

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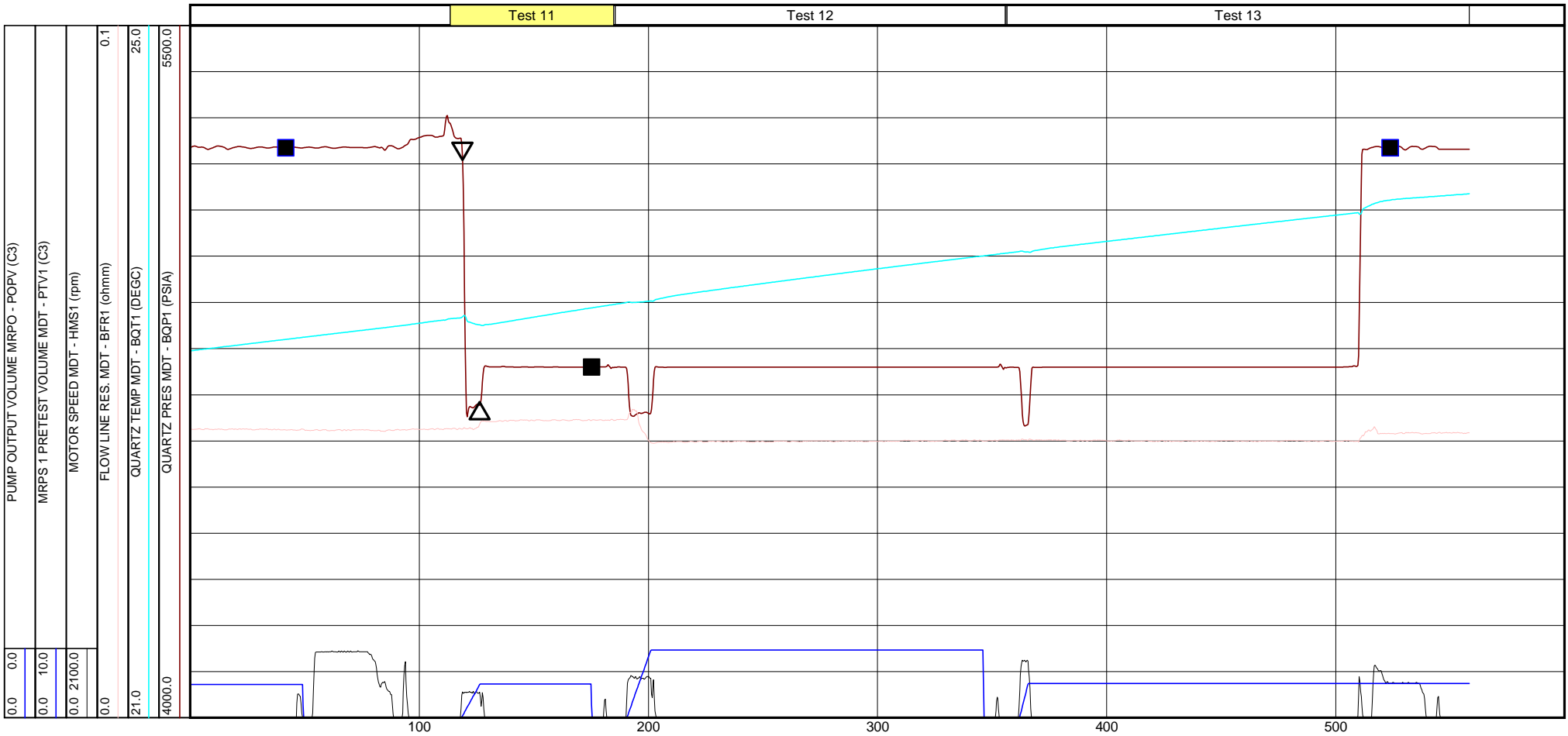
Radial Time Function Plot



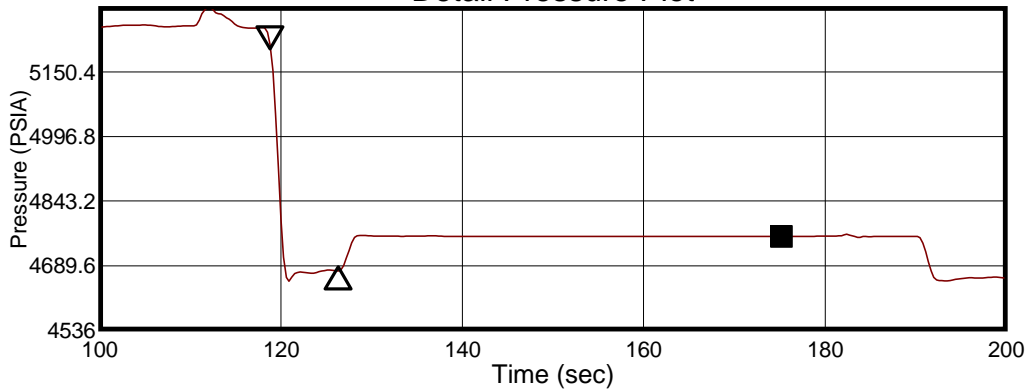
Last Buildup Pressure	: 4502.66 PSIA
Extrapolated Pressure	: 4232.93 PSIA
Horiz. Mobility Thickness	: 0.019 md.M/Cp
Radial Slope	: -566.64

Pressure Vs Time Plot : File 65 Test 11 3256.06 M (TVD)

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Detail Pressure Plot



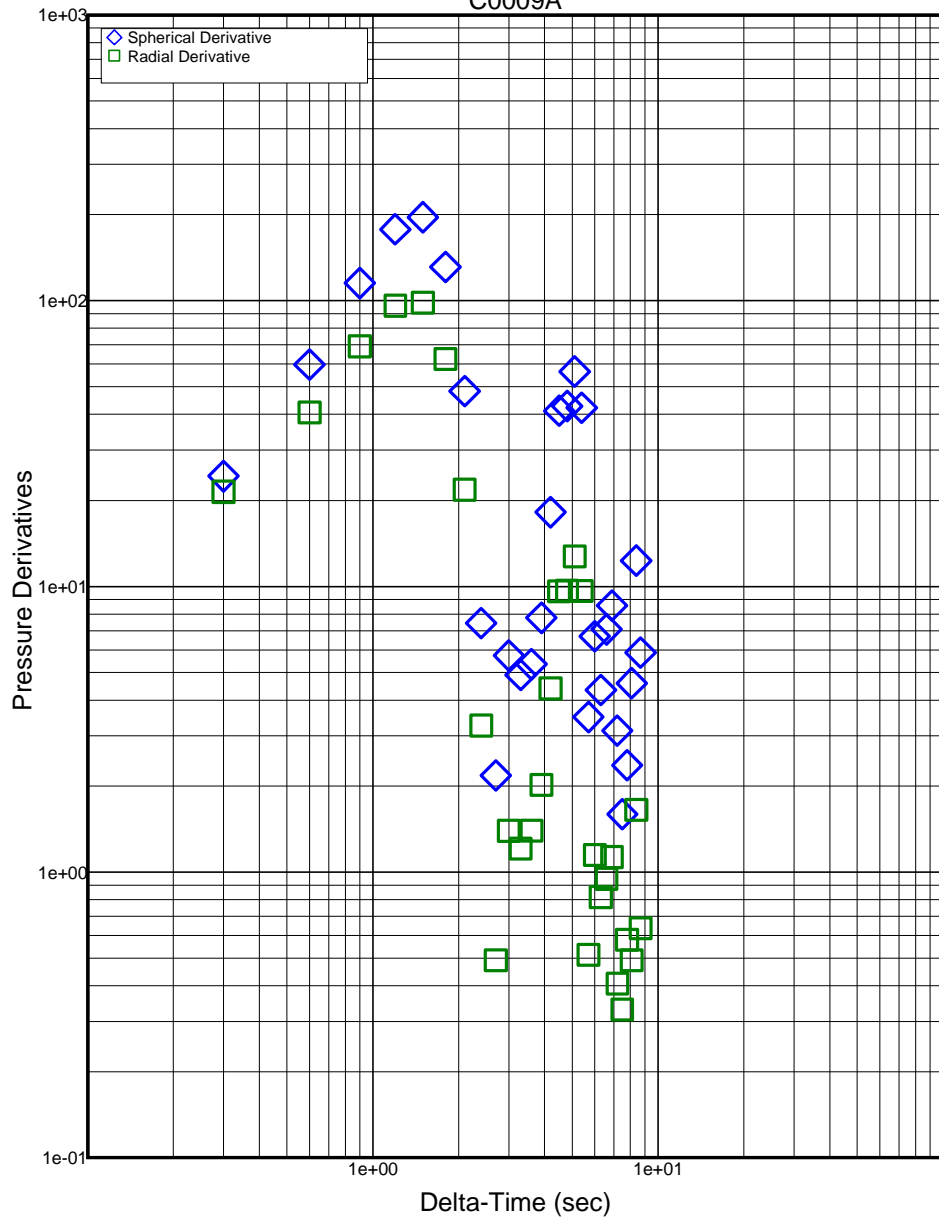
Time (sec)

- Mud Before
- ▽ Drawdown Start
- △ Buildup Start
- End Buildup
- Mud After

Tool Type	MDT
Test Type	Normal Pretest
Packer	Large-Diameter Probe
Gauge	BQP1
Formation Pressure	4759.64 PSIA
Last Read	4759.64 PSIA
Drawdown Mobility	14.865 md/cp (3.8 of 4.8 cc)
Mud Pressure Before	5235.01 PSIA
Mud Pressure After	5234.96 PSIA
Temperature Before/After	27.01 DEGC / 27.09 DEGC
Pretest Rate/Volume	0.64 c3/s / 4.8 cc

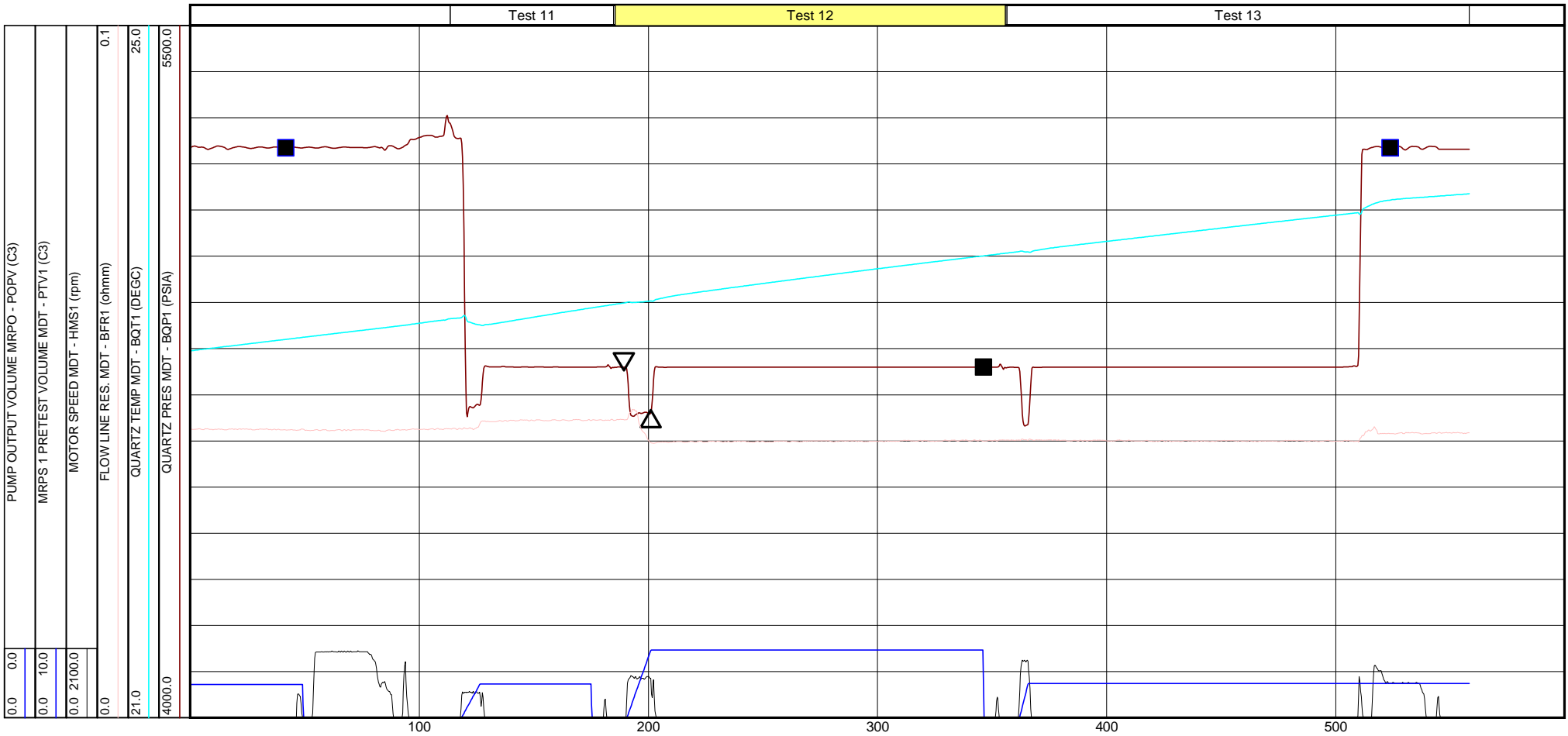
Flow Regime Identification Plot : File 65 Test 11 3256.06 M (TVD)

C0009A

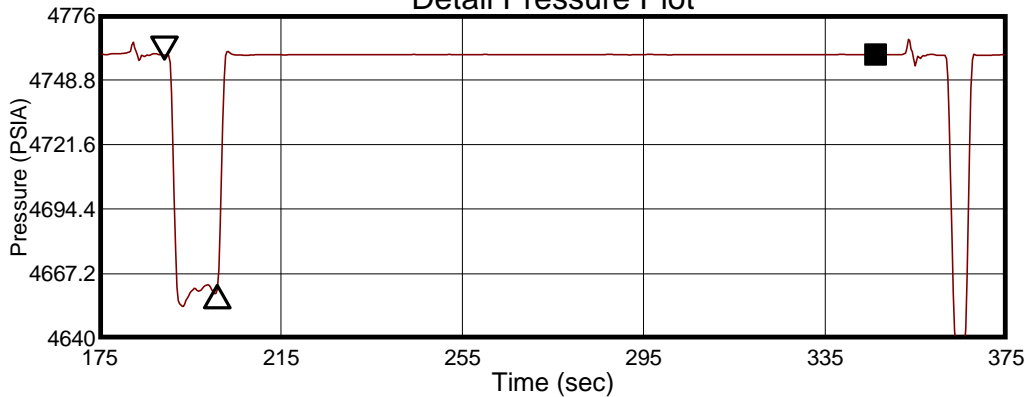


Pressure Vs Time Plot : File 65 Test 12 3256.06 M (TVD)

C0009A



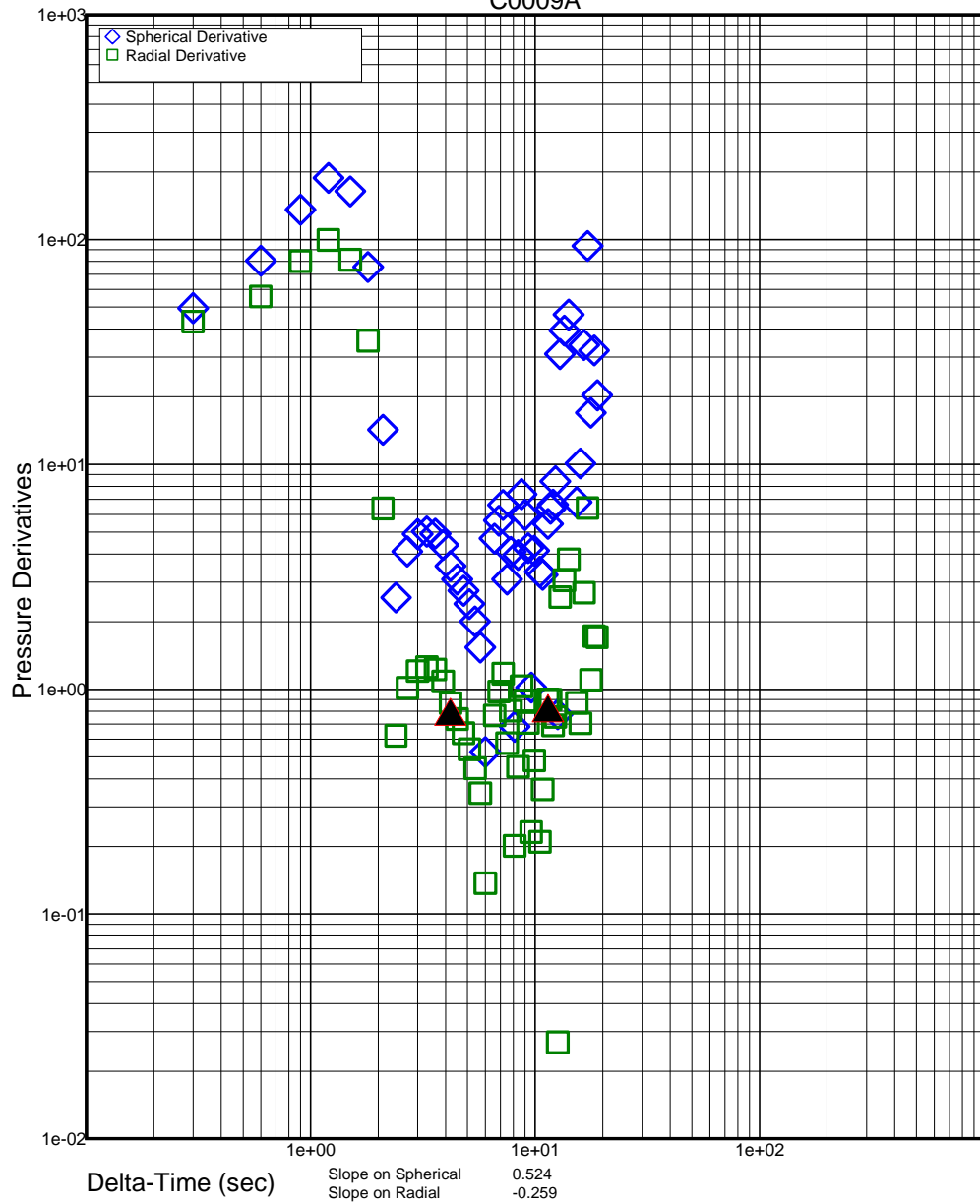
Detail Pressure Plot



Time (sec)	Tool Type	MDT
■ Mud Before	Test Type	Normal Pretest
▽ Drawdown Start	Packer	Large-Diameter Probe
△ Buildup Start	Gauge	BQP1
■ End Buildup	Formation Pressure	4759.53 PSIA
■ Mud After	Last Read	4759.54 PSIA
	Drawdown Mobility	21.629 md/cp (9.72 cc)
	Mud Pressure Before	5235.01 PSIA
	Mud Pressure After	5234.96 PSIA
	Temperature Before/After	27.13 DEGC / 27.27 DEGC
	Pretest Rate/Volume	0.83 c3/s / 9.72 cc

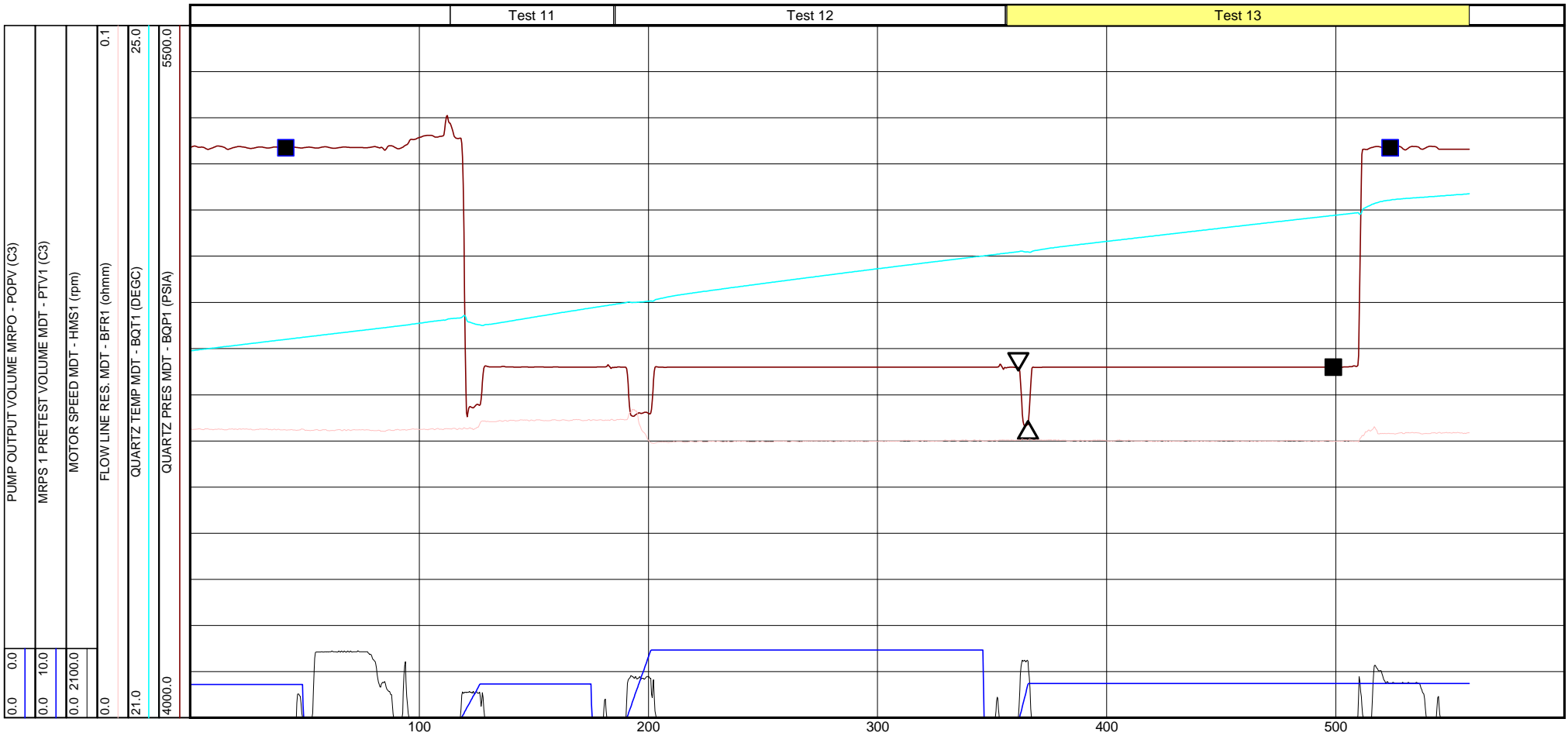
Flow Regime Identification Plot : File 65 Test 12 3256.06 M (TVD)

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Pressure Vs Time Plot : File 65 Test 13 3256.06 M (TVD)

C0009A



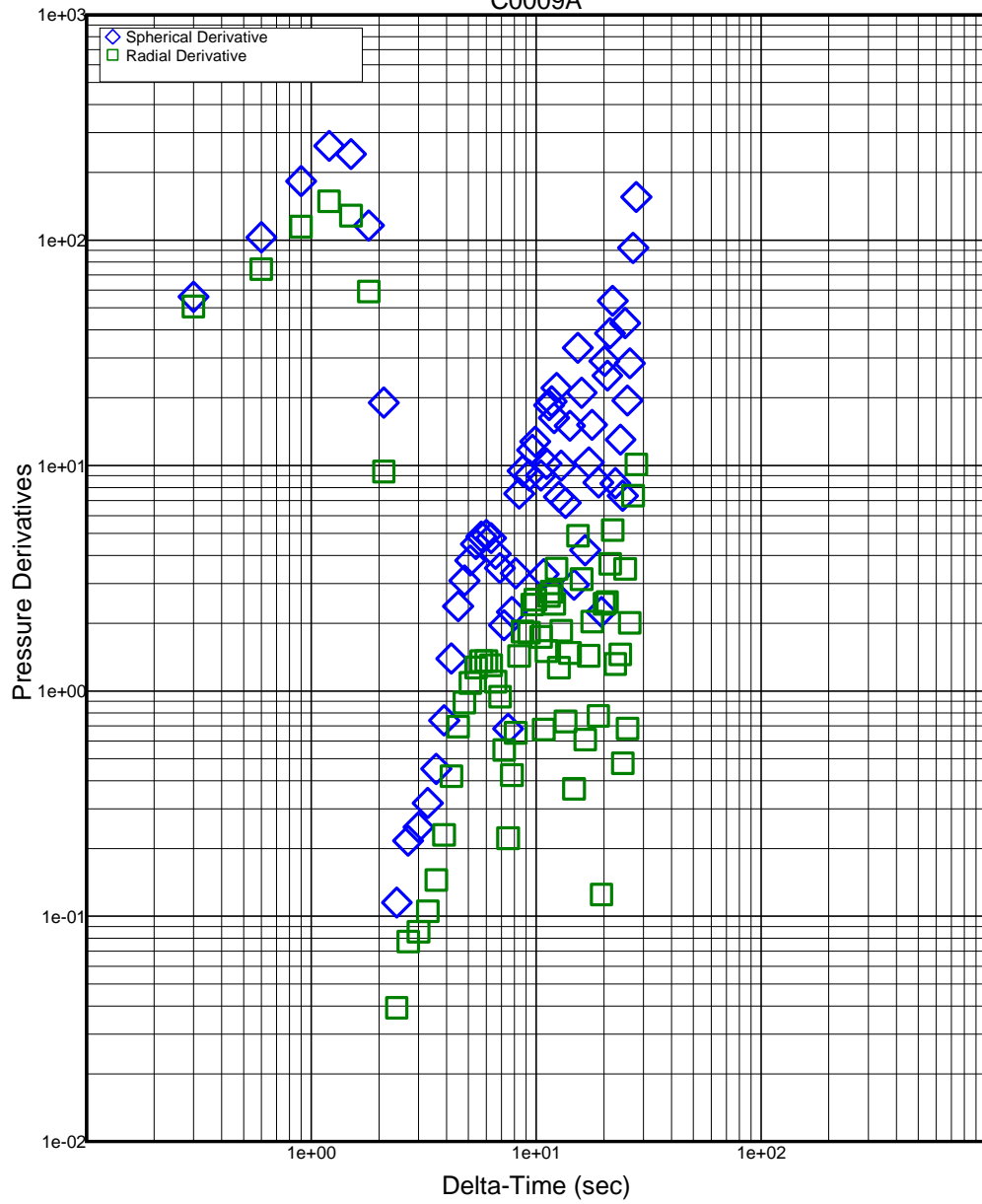
Detail Pressure Plot



Time (sec)	Tool Type	MDT
■ Mud Before	Test Type	Normal Pretest
▽ Drawdown Start	Packer	Large-Diameter Probe
△ Buildup Start	Gauge	BQP1
■ End Buildup	Formation Pressure	4759.5 PSIA
■ Mud After	Last Read	4759.5 PSIA
	Drawdown Mobility	24.157 md/cp (4.87 cc)
	Mud Pressure Before	5235.01 PSIA
	Mud Pressure After	5234.96 PSIA
	Temperature Before/After	27.27 DEGC / 27.37 DEGC
	Pretest Rate/Volume	1.16 c3/s / 4.87 cc

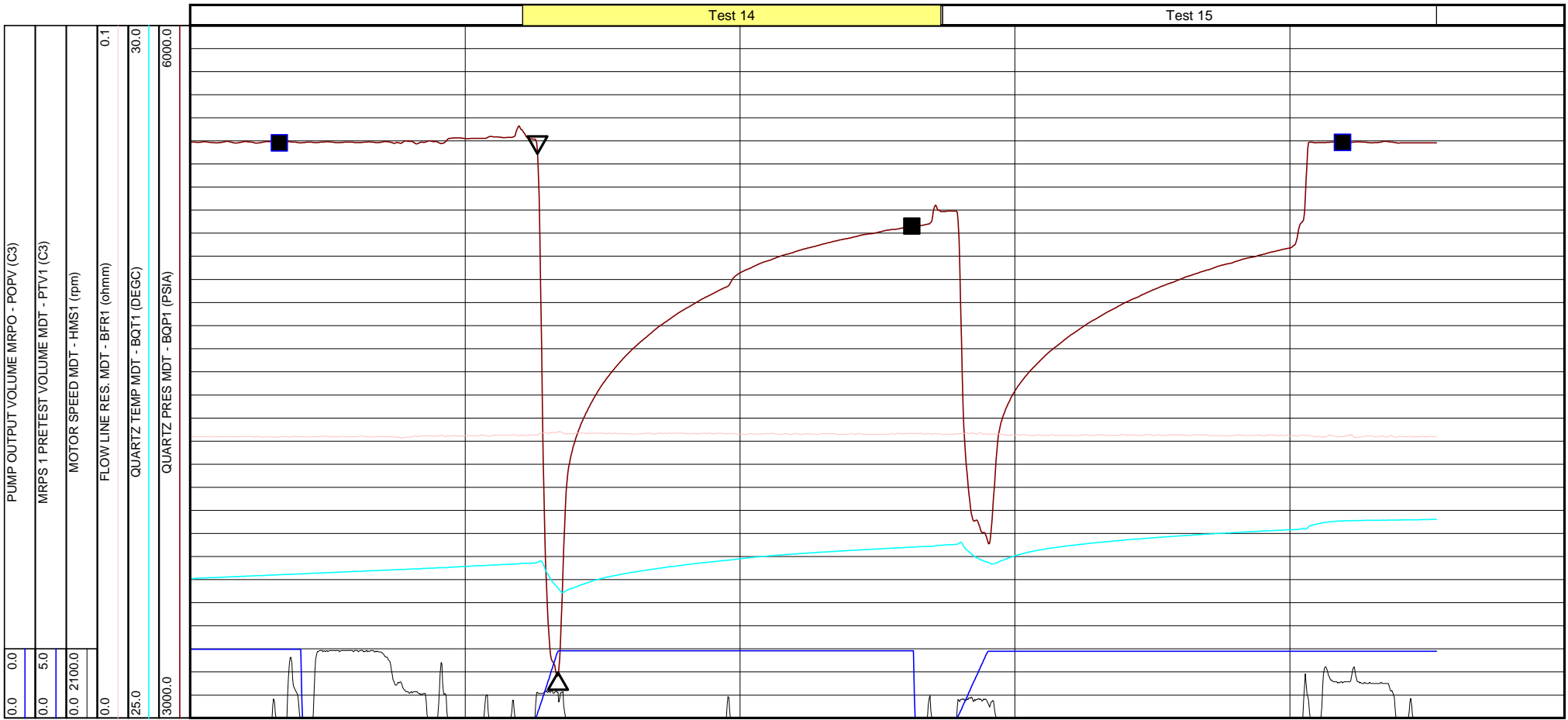
Flow Regime Identification Plot : File 65 Test 13 3256.06 M (TVD)

C0009A

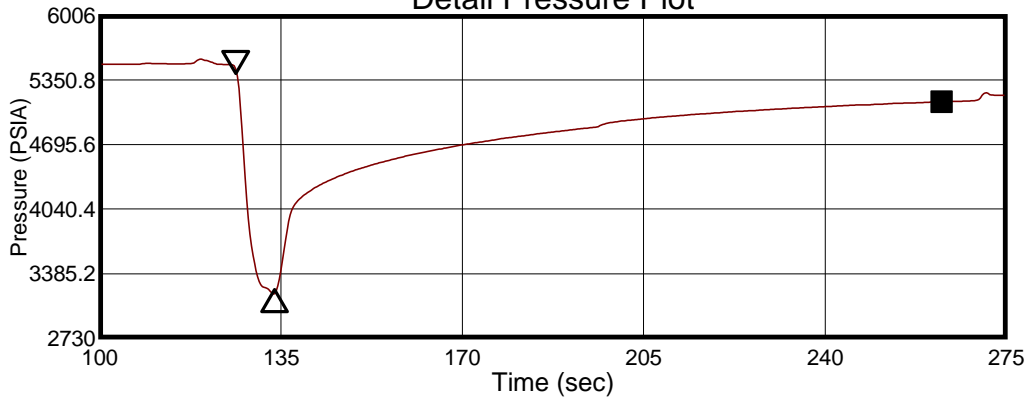


Pressure Vs Time Plot : File 67 Test 14 3416.99 M (TVD)

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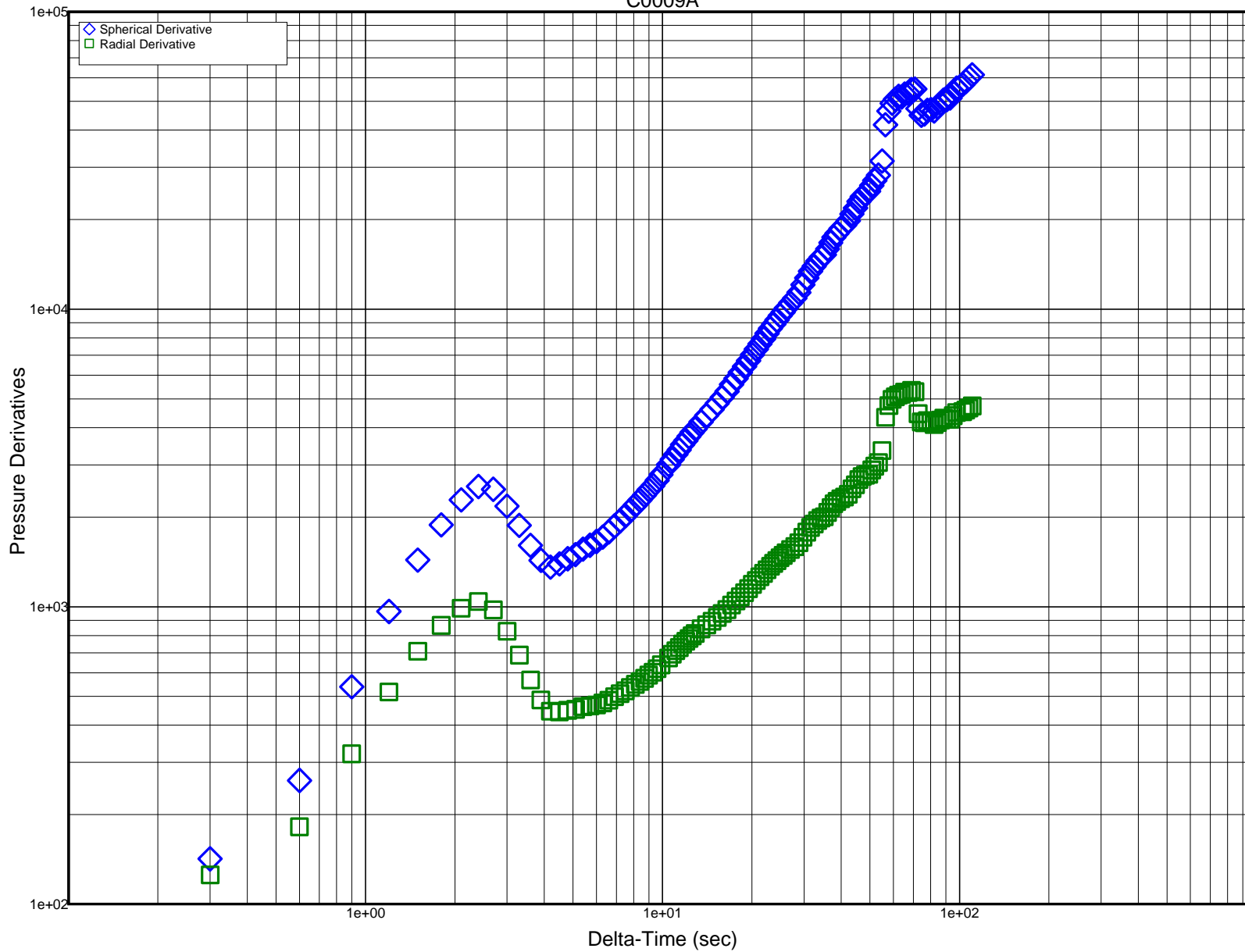
Detail Pressure Plot



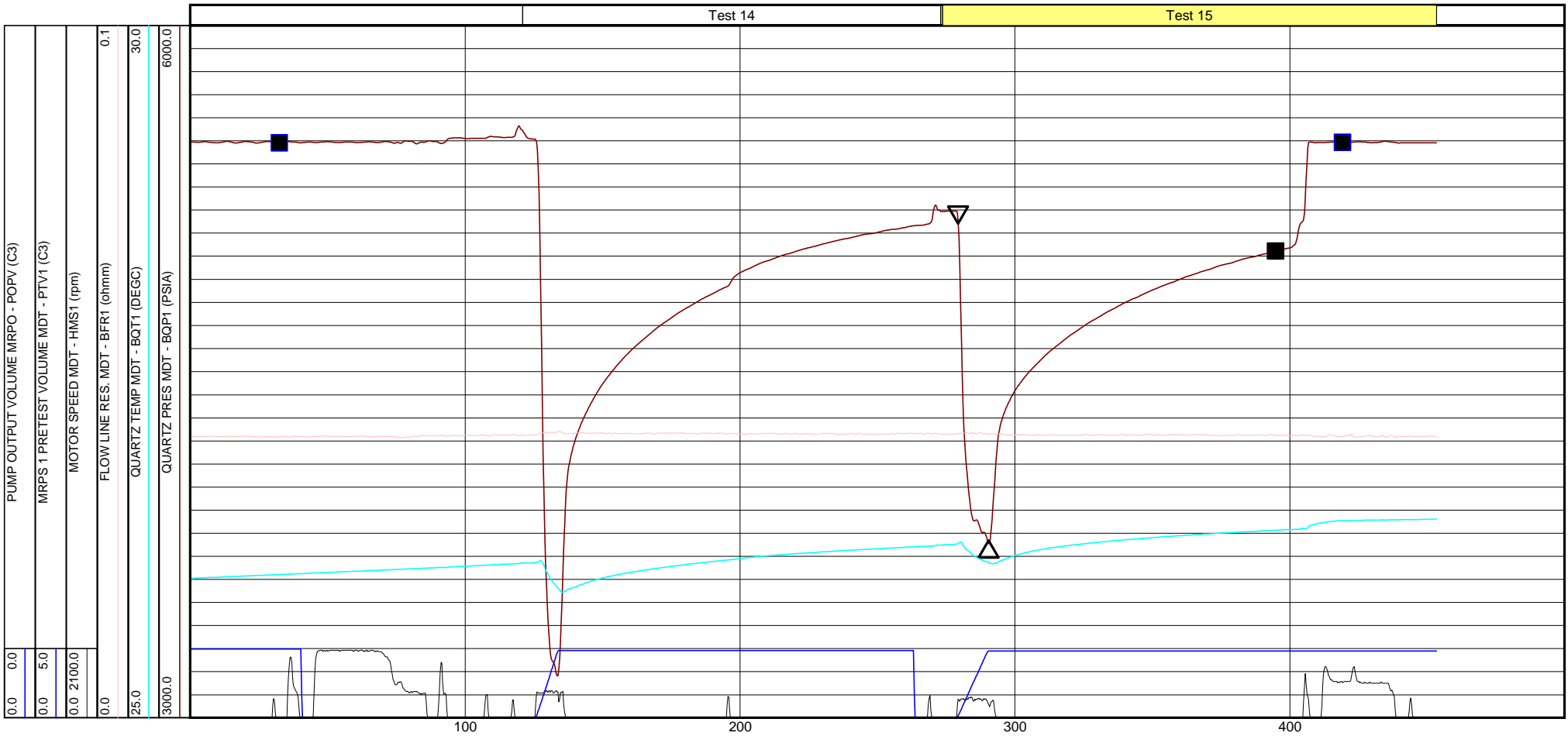
Time (sec)	Tool Type	MDT
■ Mud Before	Test Type	Limited Drawdown
▽ Drawdown Start	Packer	Large-Diameter Probe
△ Buildup Start	Gauge	BQP1
■ End Buildup	Formation Pressure	5130.89 PSIA
■ Mud After	Last Read	5130.89 PSIA
	Drawdown Mobility	0.192 md/cp (4.15 of 4.83 cc)
	Mud Pressure Before	5491.13 PSIA
	Mud Pressure After	5493.57 PSIA
	Temperature Before/After	27.78 DEGC / 28.03 DEGC
	Pretest Rate/Volume	0.64 c3/s / 4.83 cc

Flow Regime Identification Plot : File 67 Test 14 3416.99 M (TVD)

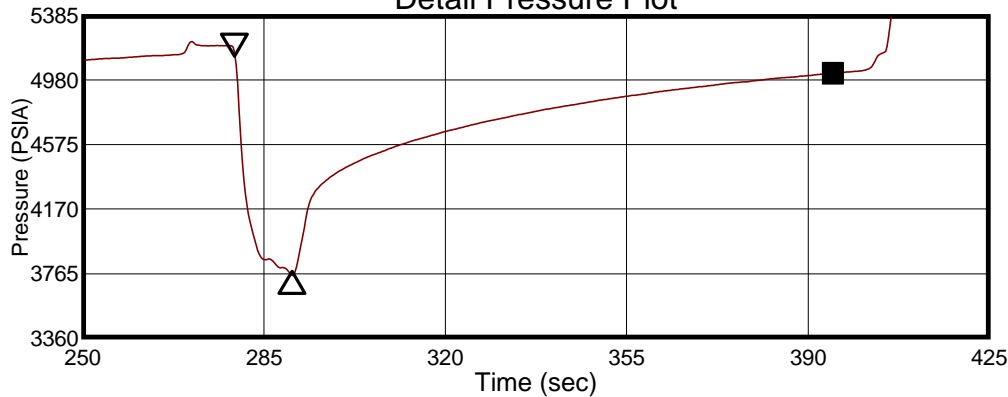
C0009A



Pressure Vs Time Plot : File 67 Test 15 3416.99 M (TVD)
C0009A



Detail Pressure Plot



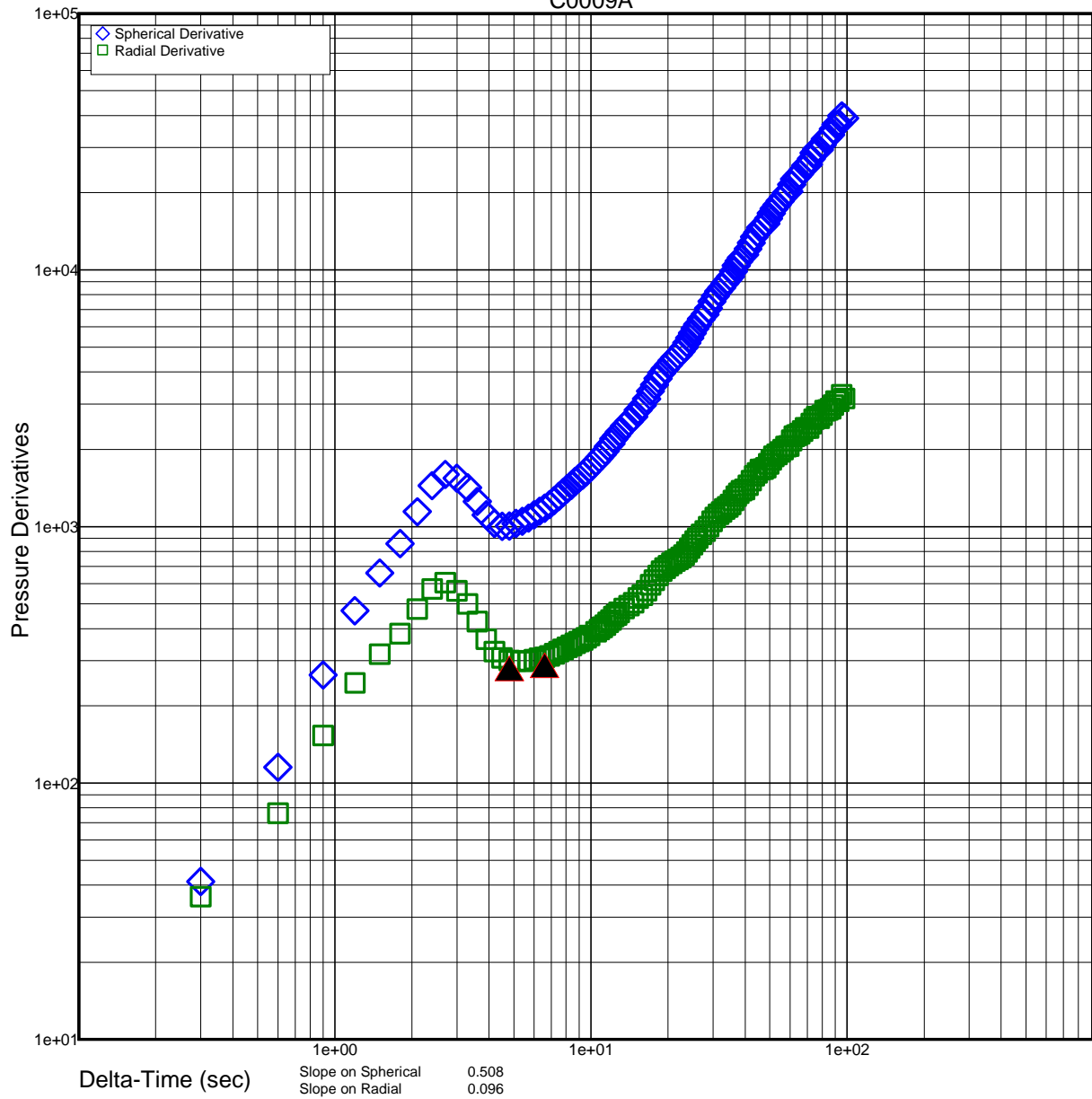
Time (sec)

- Mud Before
- ▽ Drawdown Start
- △ Buildup Start
- End Buildup
- Mud After

Tool Type	MDT
Test Type	Limited Drawdown
Packer	Large-Diameter Probe
Gauge	BQP1
Formation Pressure	4619.69 PSIA
Last Read	5022.18 PSIA
Drawdown Mobility	0.277 md/cp (4.55 of 4.84 cc)
Mud Pressure Before	5491.13 PSIA
Mud Pressure After	5493.57 PSIA
Temperature Before/After	27.88 DEGC / 28.07 DEGC
Pretest Rate/Volume	0.44 c3/s / 4.84 cc

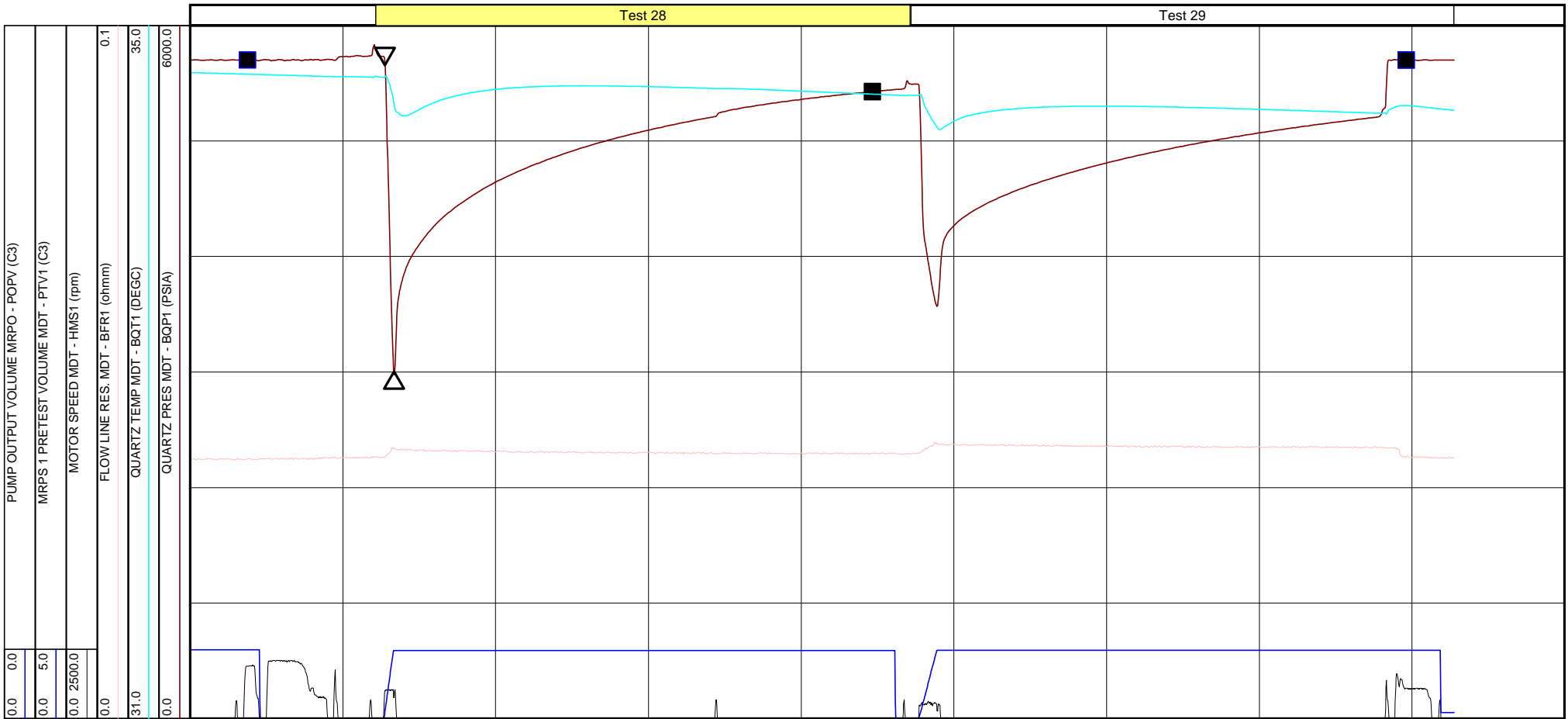
Flow Regime Identification Plot : File 67 Test 15 3416.99 M (TVD)

C0009A

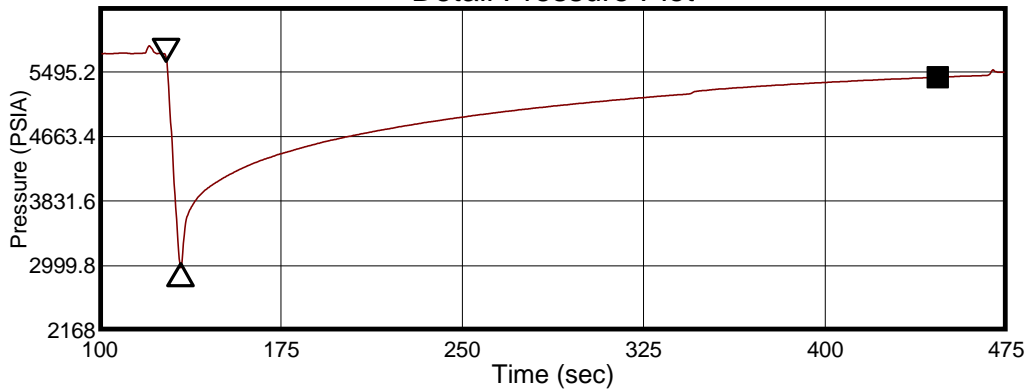


Pressure Vs Time Plot : File 75 Test 28 3545.98 M (TVD)

C0009A



Detail Pressure Plot



Time (sec)

- Mud Before
- ▽ Drawdown Start
- △ Buildup Start
- End Buildup
- Mud After

Tool Type
Test Type
Packer
Gauge
Formation Pressure
Last Read
Drawdown Mobility

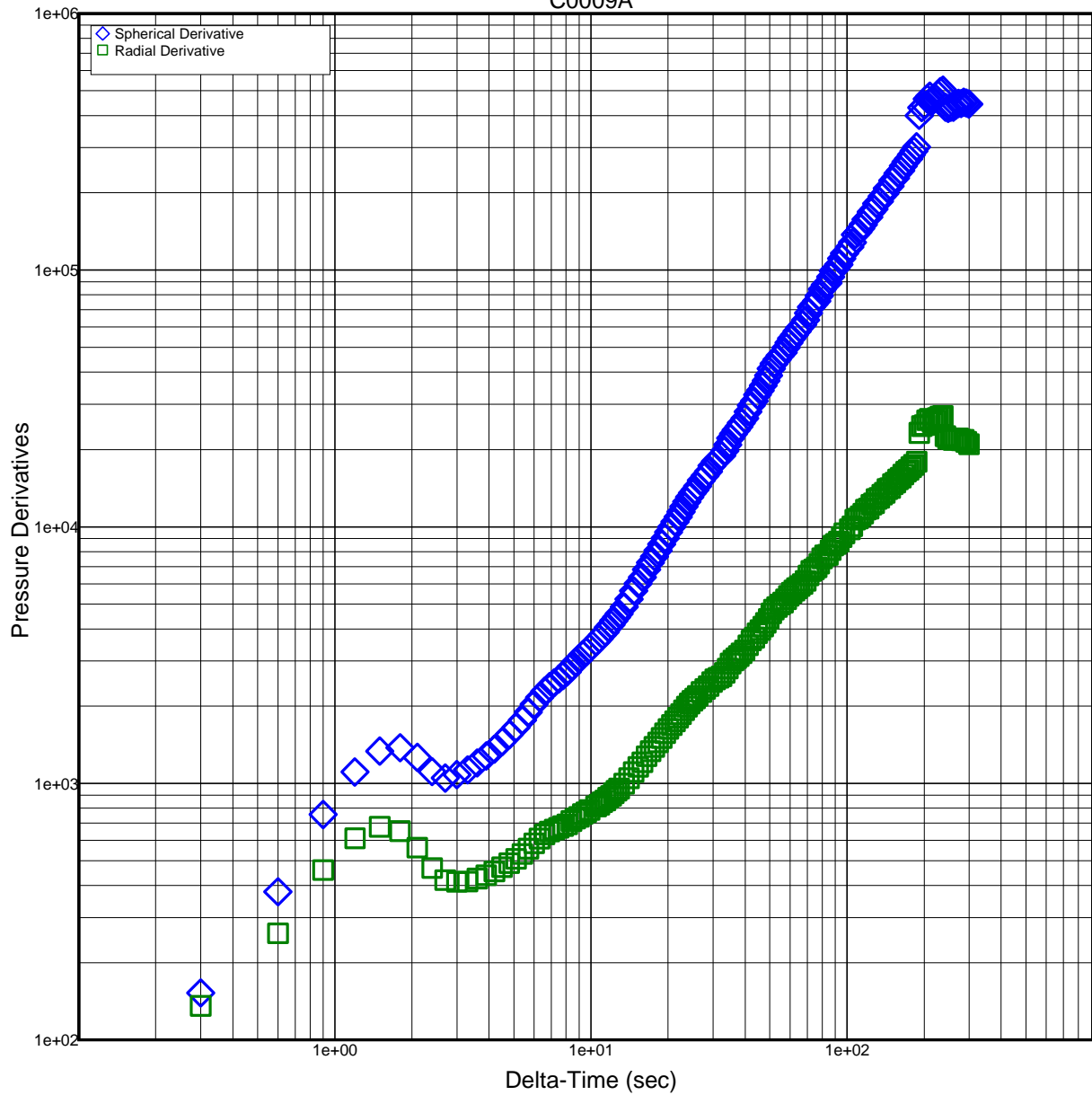
MDT
Limited Drawdown
Large-Diameter Probe
BQP1
5428.09 PSIA
5428.09 PSIA
0.059 md/cp (3.9 of 4.91 cc)

Mud Pressure Before
Mud Pressure After
Temperature Before/After
Pretest Rate/Volume

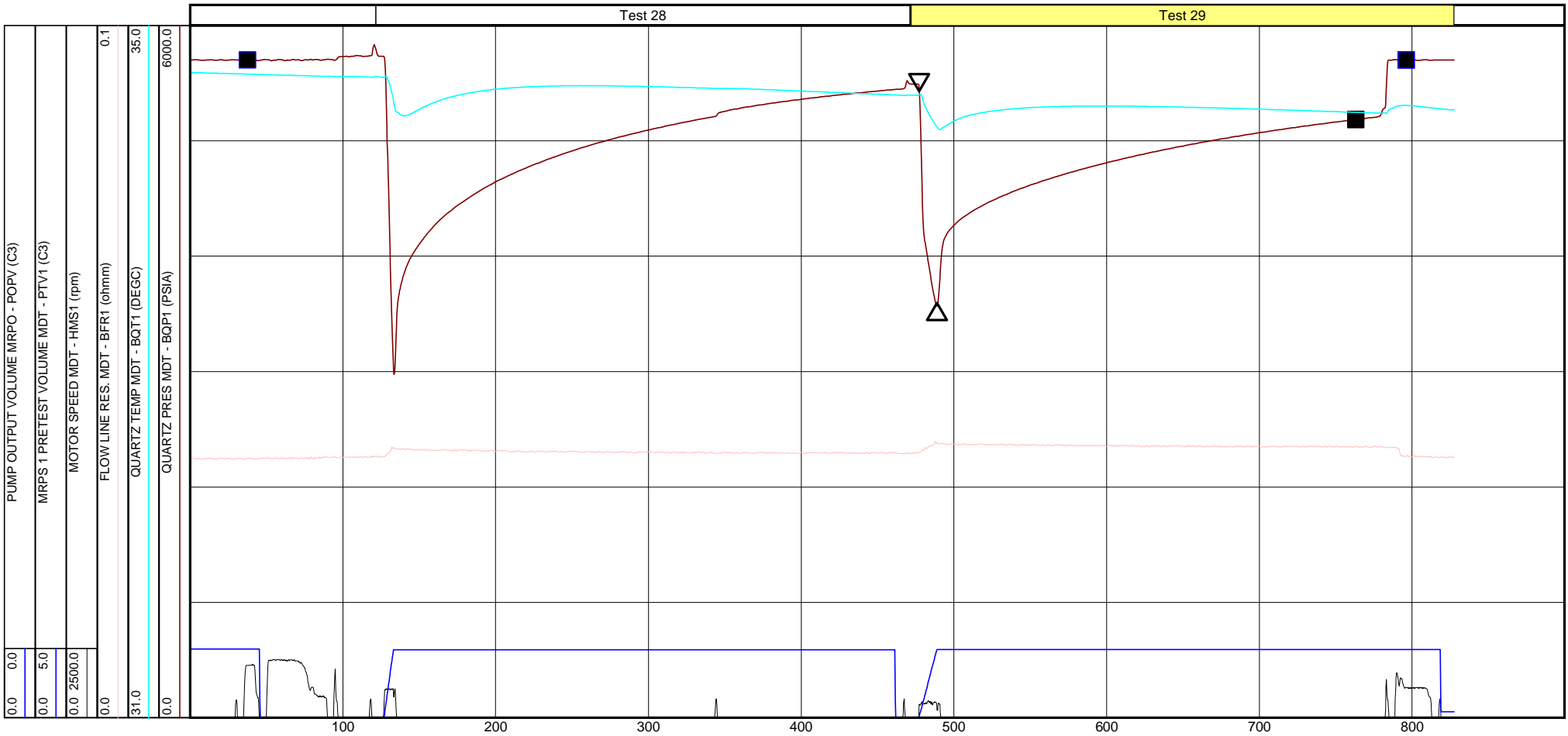
5701.61 PSIA
5701.13 PSIA
33.23 DEGC / 33.35 DEGC
0.82 c3/s / 4.91 cc

Flow Regime Identification Plot : File 75 Test 28 3545.98 M (TVD)

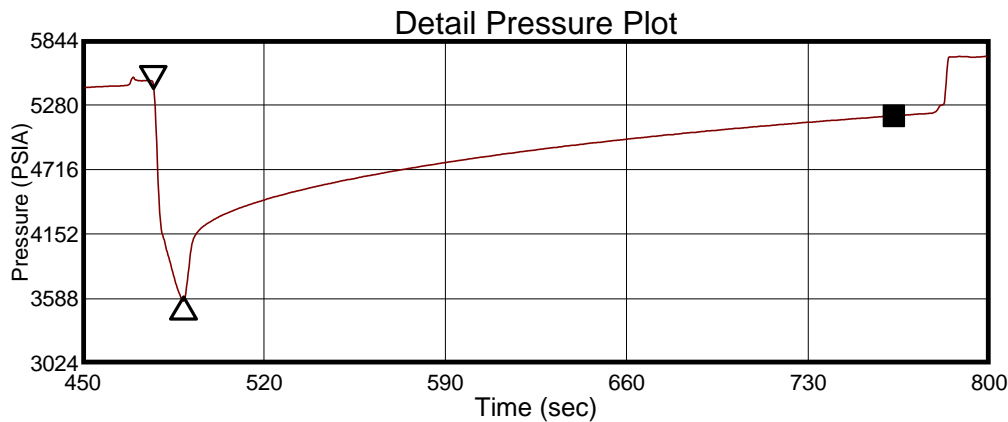
C0009A



Pressure Vs Time Plot : File 75 Test 29 3545.98 M (TVD) C0009A



Detail Pressure Plot



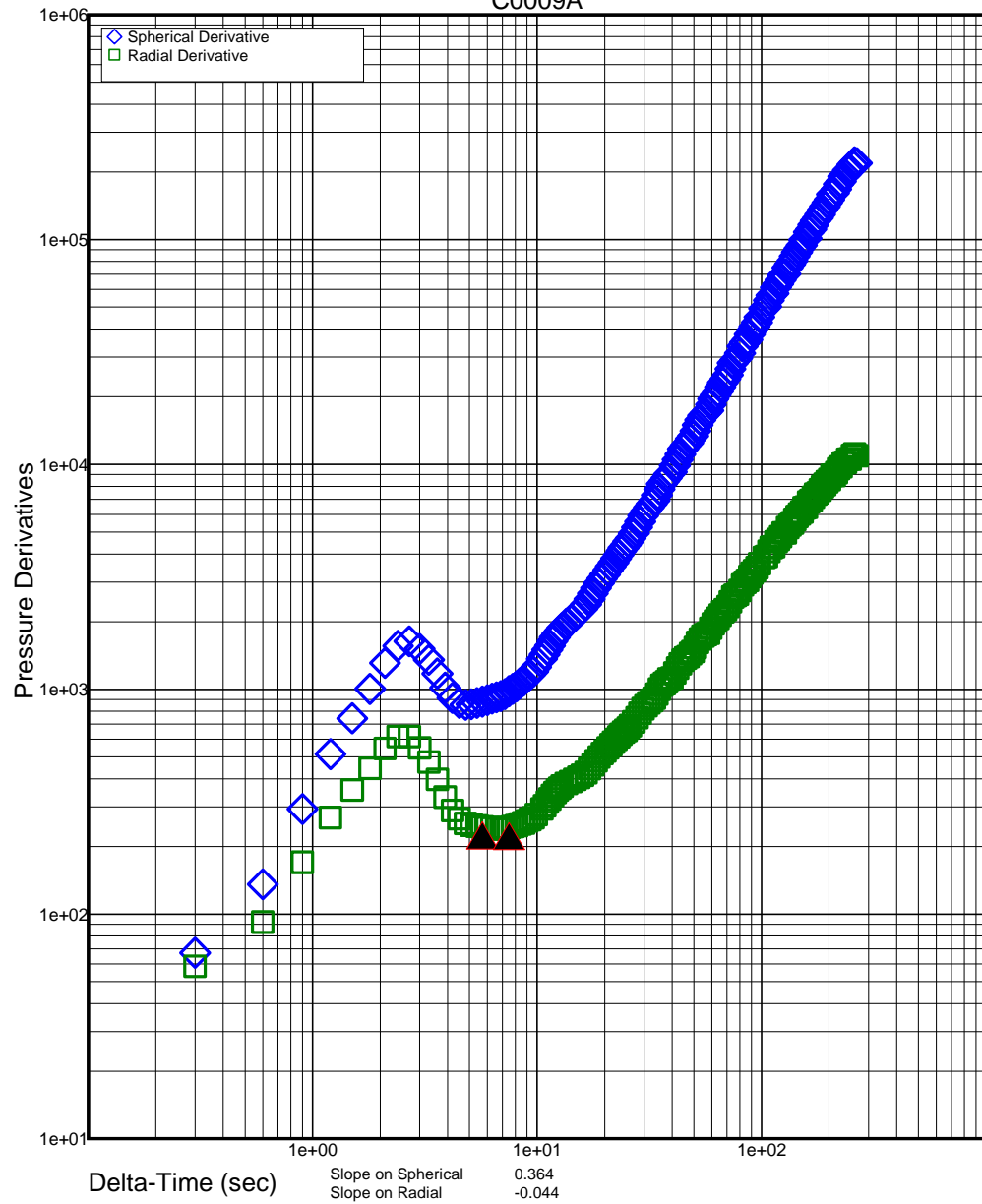
Time (sec)

- Mud Before
- ▽ Drawdown Start
- △ Buildup Start
- End Buildup
- Mud After

Tool Type	MDT
Test Type	Limited Drawdown
Packer	Large-Diameter Probe
Gauge	BQP1
Formation Pressure	4422.35 PSIA
Last Read	5185.5 PSIA
Drawdown Mobility	0.098 md/cp (4.57 of 4.94)
Mud Pressure Before	5701.61 PSIA
Mud Pressure After	5701.13 PSIA
Temperature Before/After	33.1 DEGC / 33.16 DEGC
Pretest Rate/Volume	0.42 c3/s / 4.94 cc

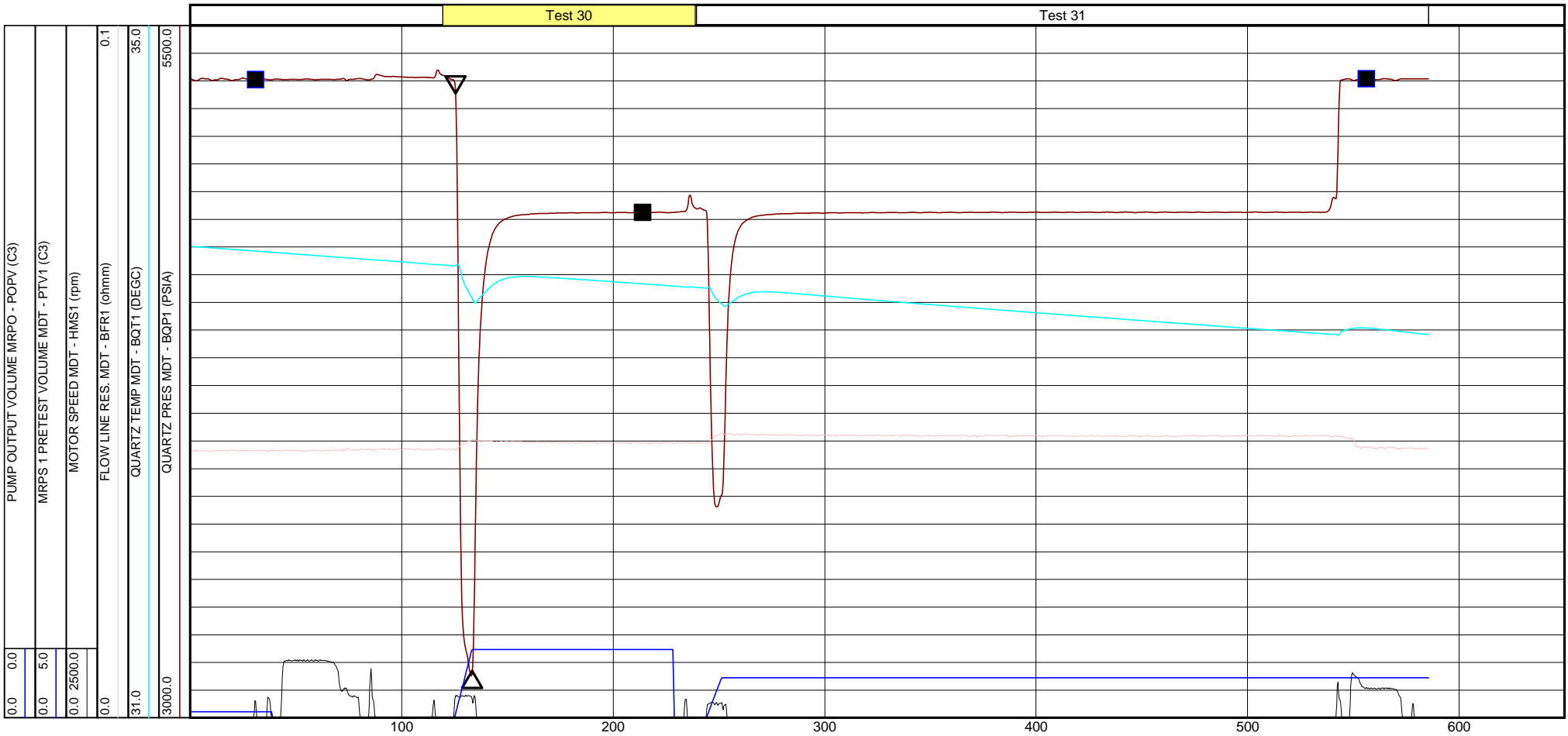
Flow Regime Identification Plot : File 75 Test 29 3545.98 M (TVD)

C0009A

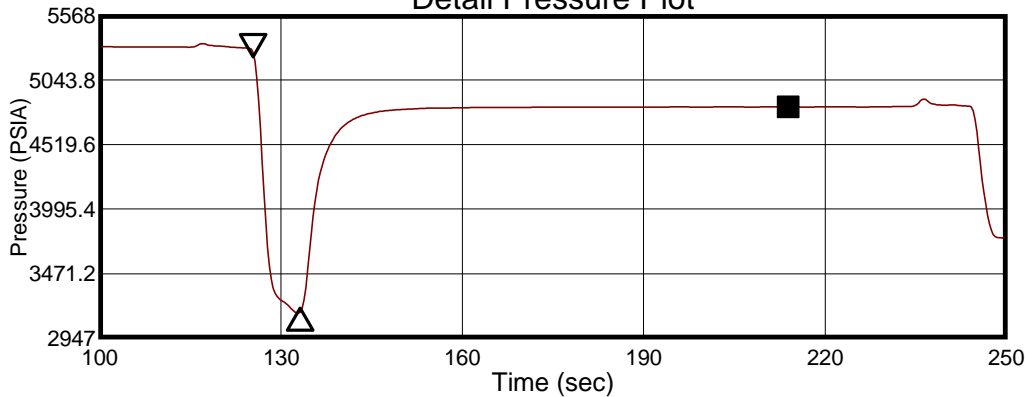


Pressure Vs Time Plot : File 78 Test 30 3300.03 M (TVD)

C0009A



Detail Pressure Plot



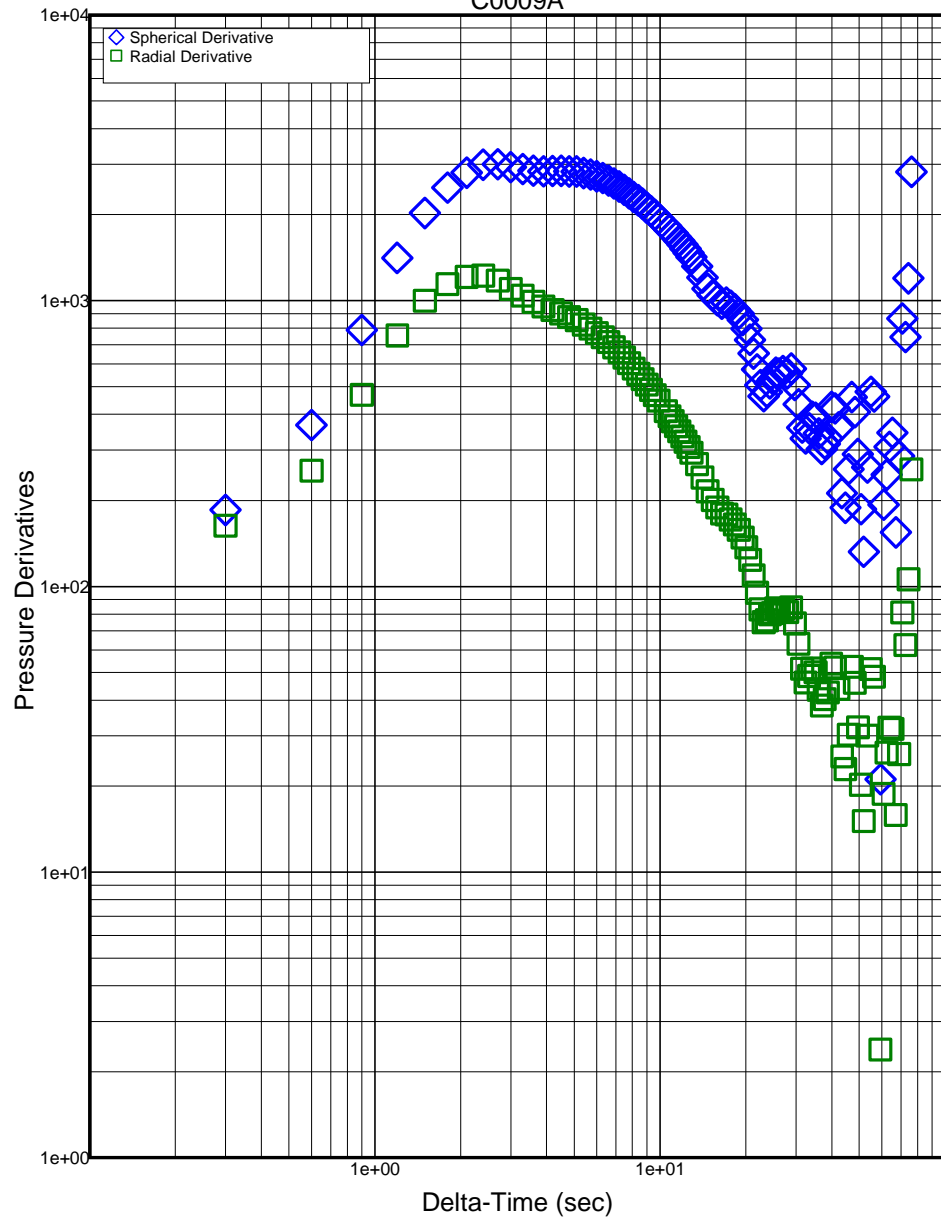
Time (sec)

- Mud Before
- ▽ Drawdown Start
- △ Buildup Start
- End Buildup
- Mud After

Tool Type	MDT
Test Type	Normal Pretest
Packer	Large-Diameter Probe
Gauge	BQP1
Formation Pressure	4825.1 PSIA
Last Read	4825.1 PSIA
Drawdown Mobility	0.663 md/cp (4.12 of 4.93 cc)
Mud Pressure Before	5304.4 PSIA
Mud Pressure After	5307.68 PSIA
Temperature Before/After	31.15 DEGC / 31.08 DEGC
Pretest Rate/Volume	0.63 c3/s / 4.93 cc

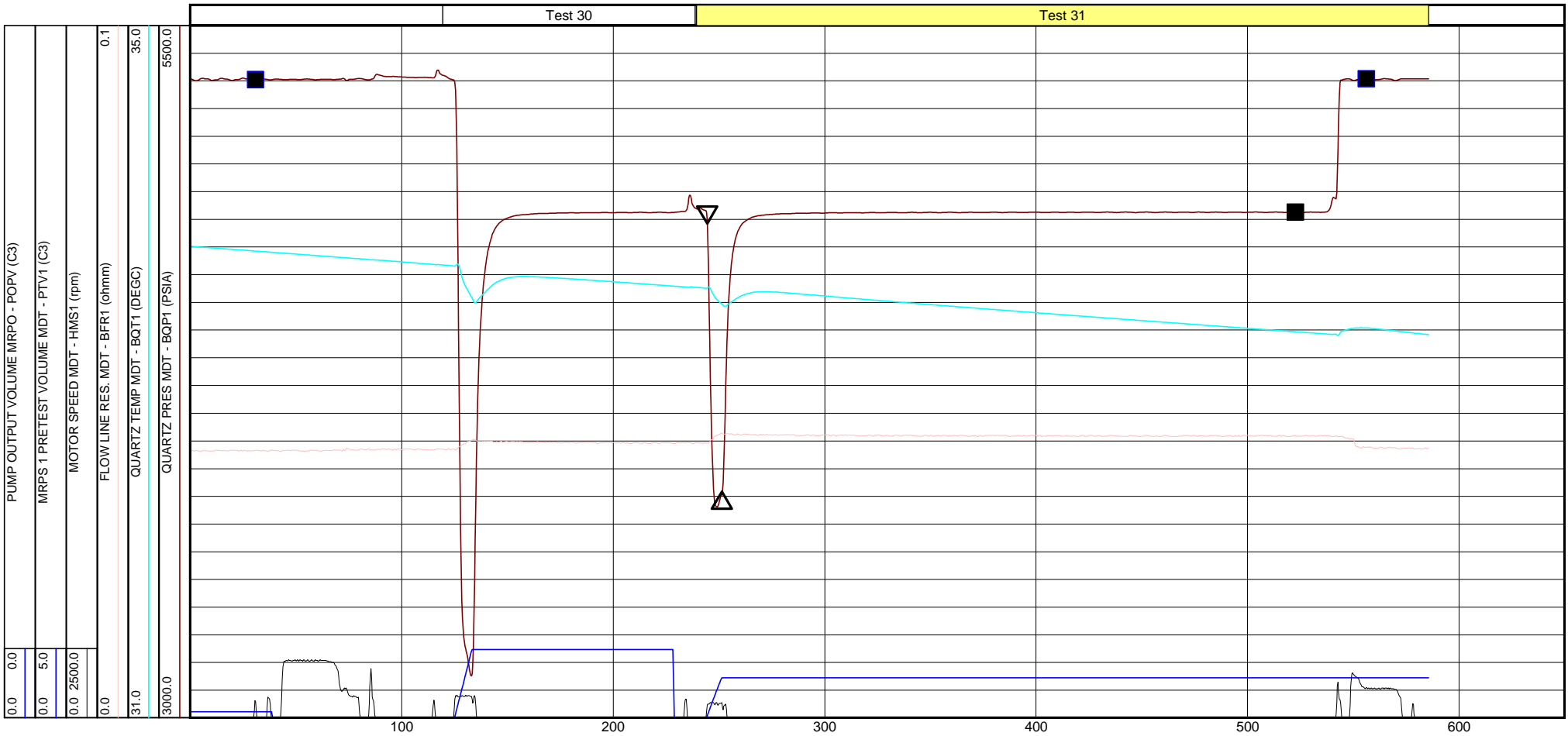
Flow Regime Identification Plot : File 78 Test 30 3300.03 M (TVD)

C0009A

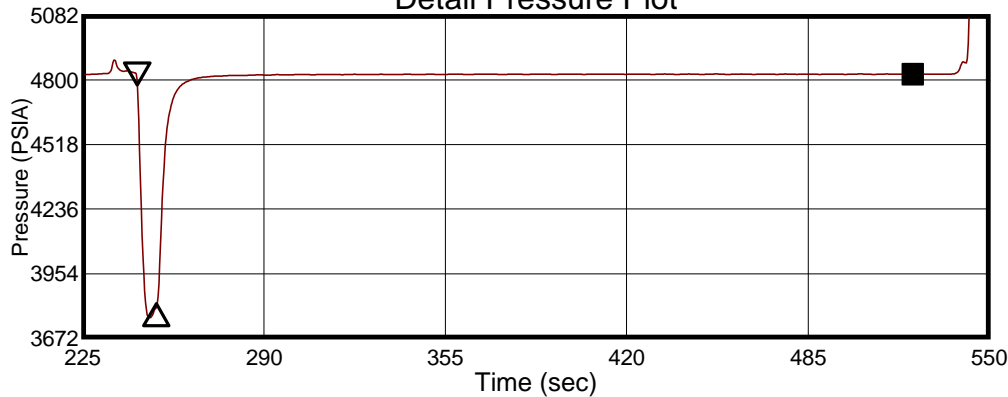


Pressure Vs Time Plot : File 78 Test 31 3300.03 M (TVD)

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Detail Pressure Plot



Time (sec)

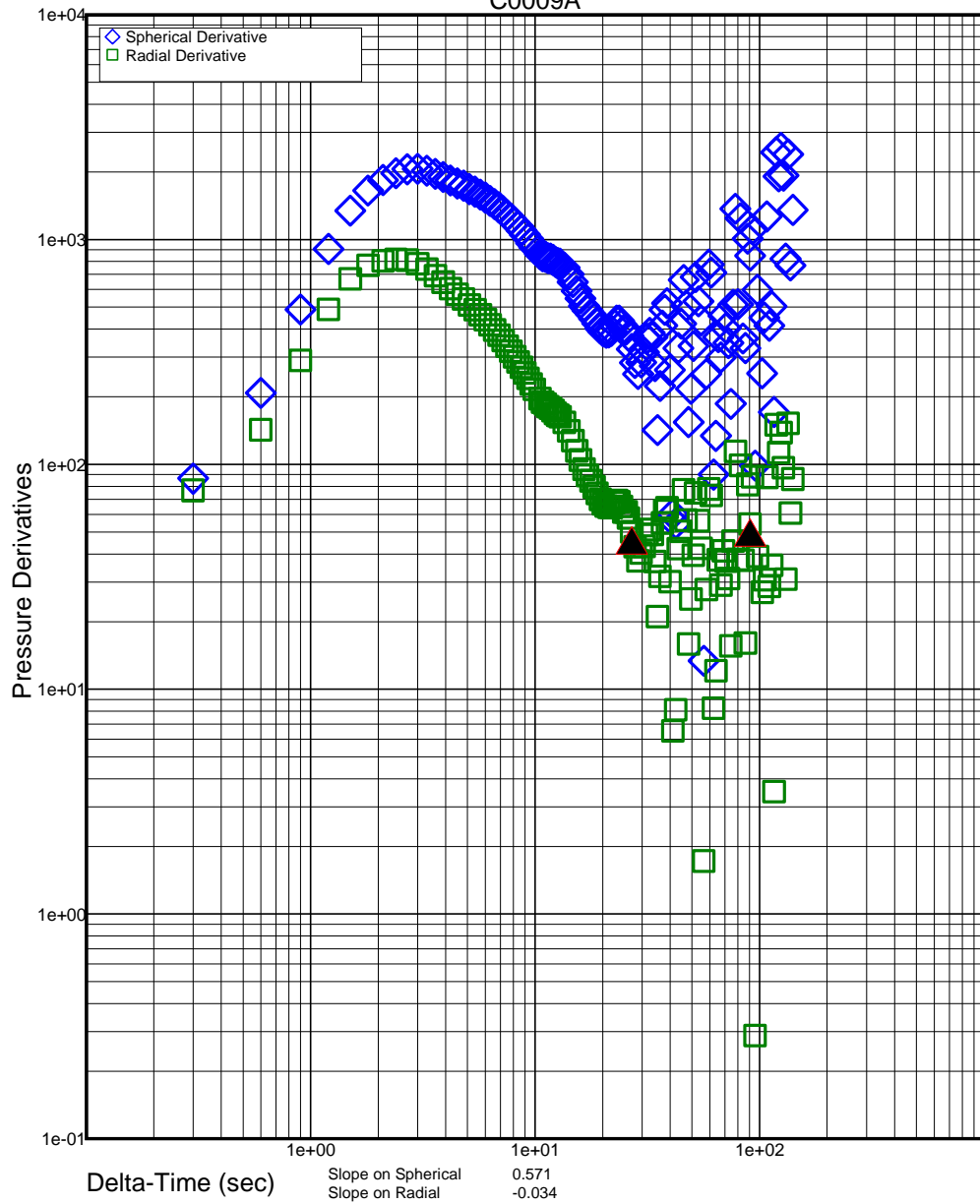
- Mud Before
- ▽ Drawdown Start
- △ Buildup Start
- End Buildup
- Mud After

Tool Type
 Test Type
 Packer
 Gauge
 Formation Pressure
 Last Read
 Drawdown Mobility
 MDT
 Normal Pretest
 Large-Diameter Probe
 BQP1
 4826.73 PSIA
 4825.65 PSIA
 0.749 md/cp (2.9 cc)

Mud Pressure Before
 Mud Pressure After
 Temperature Before/After
 Pretest Rate/Volume
 5304.4 PSIA
 5307.68 PSIA
 30.92 DEGC / 30.75 DEGC
 0.42 c3/s / 2.9 cc

Flow Regime Identification Plot : File 78 Test 31 3300.03 M (TVD)

C0009A



C0009A
Kumanonada, Offshore
Kii Peninsula

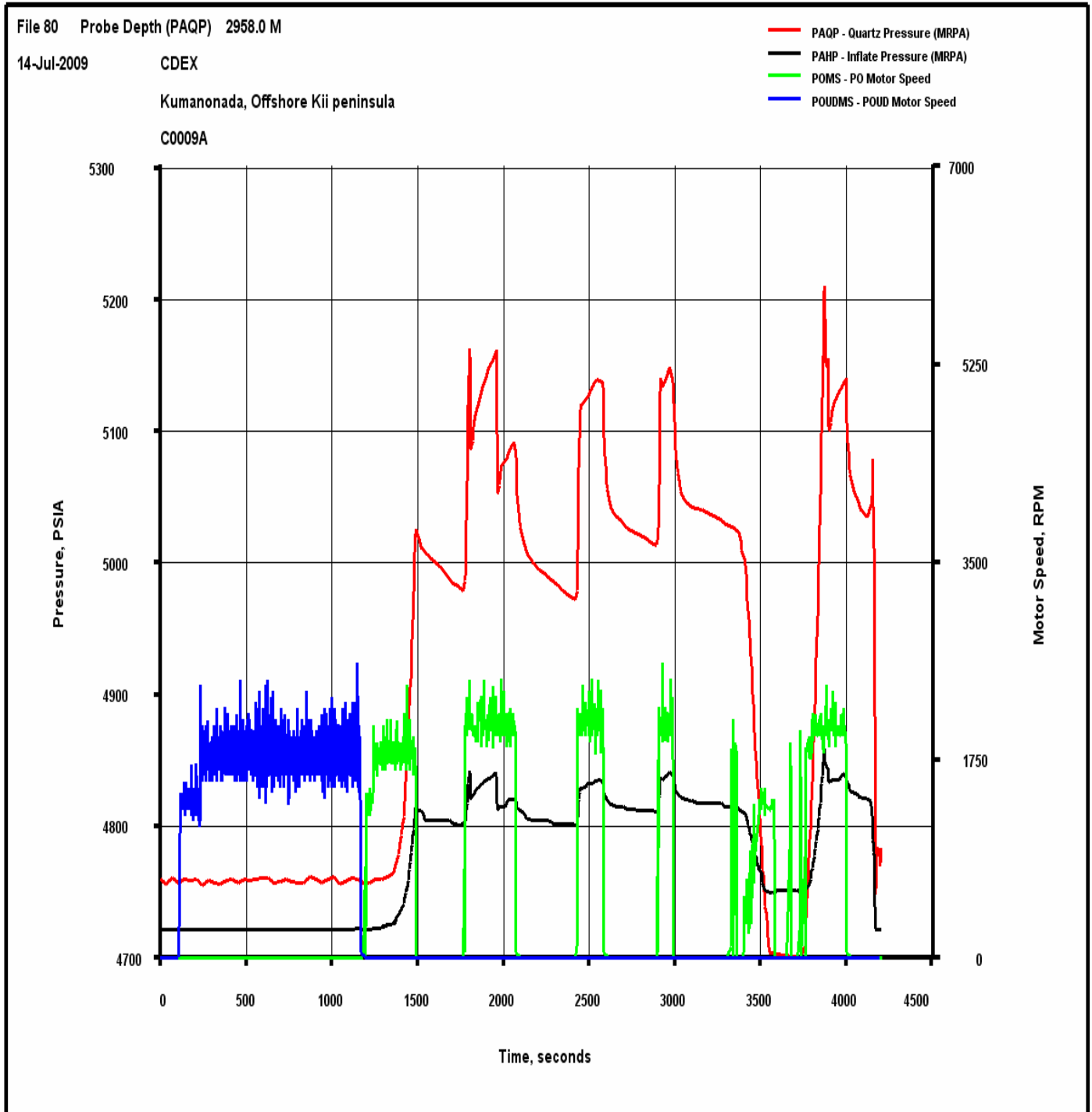
MDT Dual Packer Stress
Test and Mobility Test

MDT Single Probe Pretest

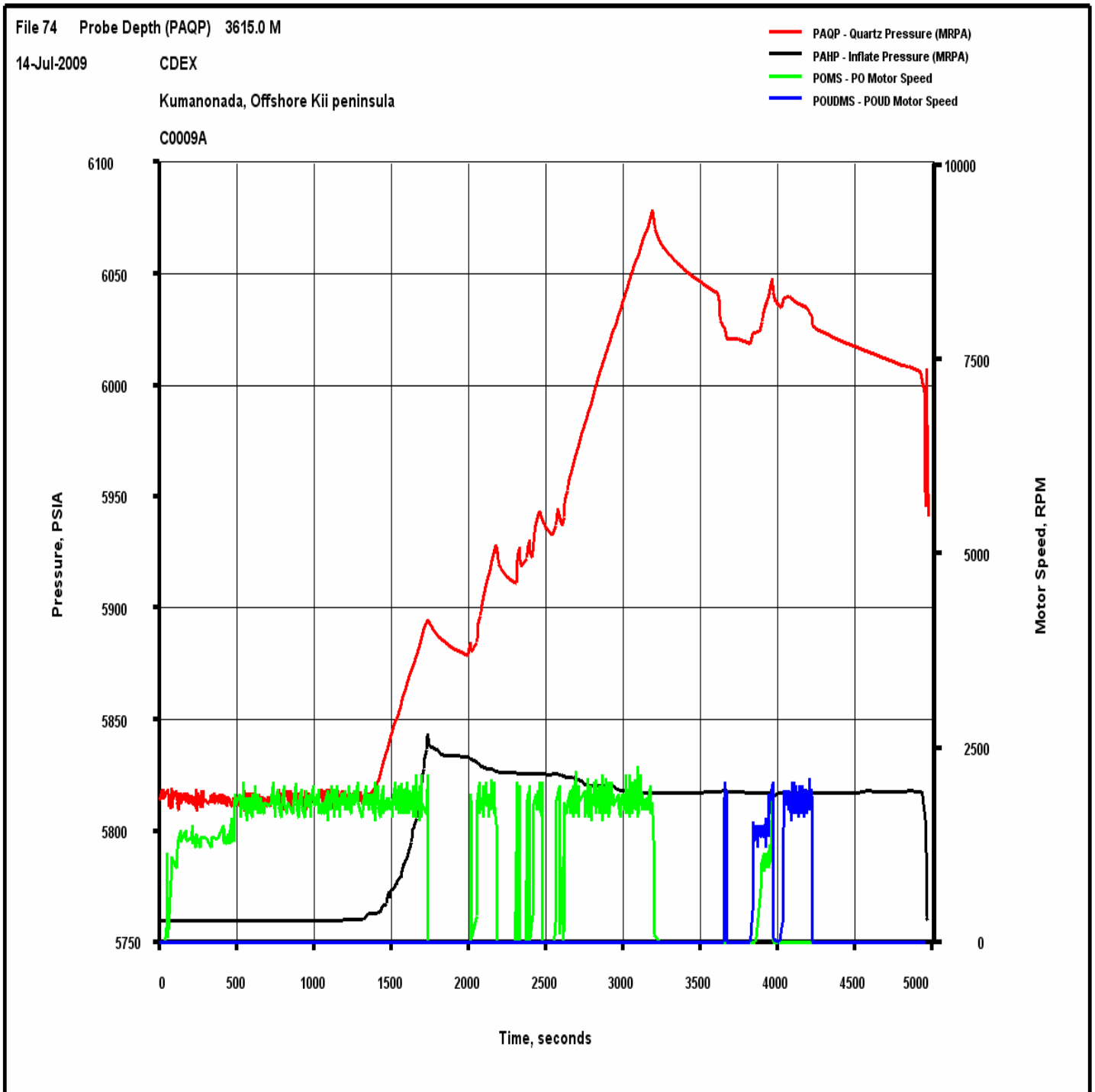
Dual Packer Stress Test and Mobility Test

- Stress test at 2958 m is reliable and minimum stress could be bracketed from fall-off response seen – it takes about 400 psi over-pressure to fracture the formation here
- Stress test at 3615 m is not valid – injection over-pressure is only about 250 psi – should have injected higher pressure
- Dual Packer Mobility Test will be very difficult to interpret – should have Pump Out once only and stop PO to Build Up as long as possible

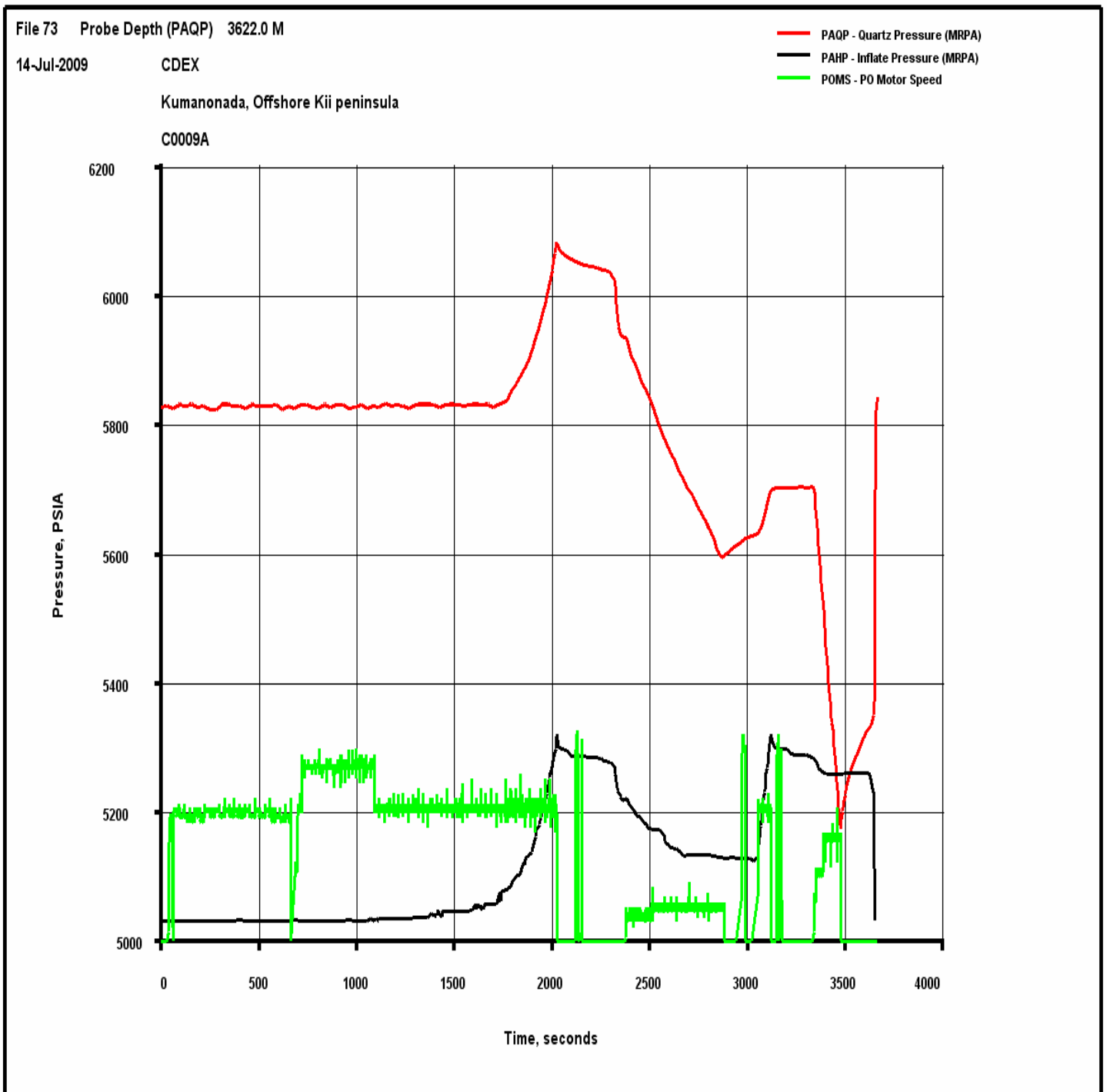
2958 m – Dual Packer Stress Test File 80



3615 m – Dual Packer Stress Test File 74



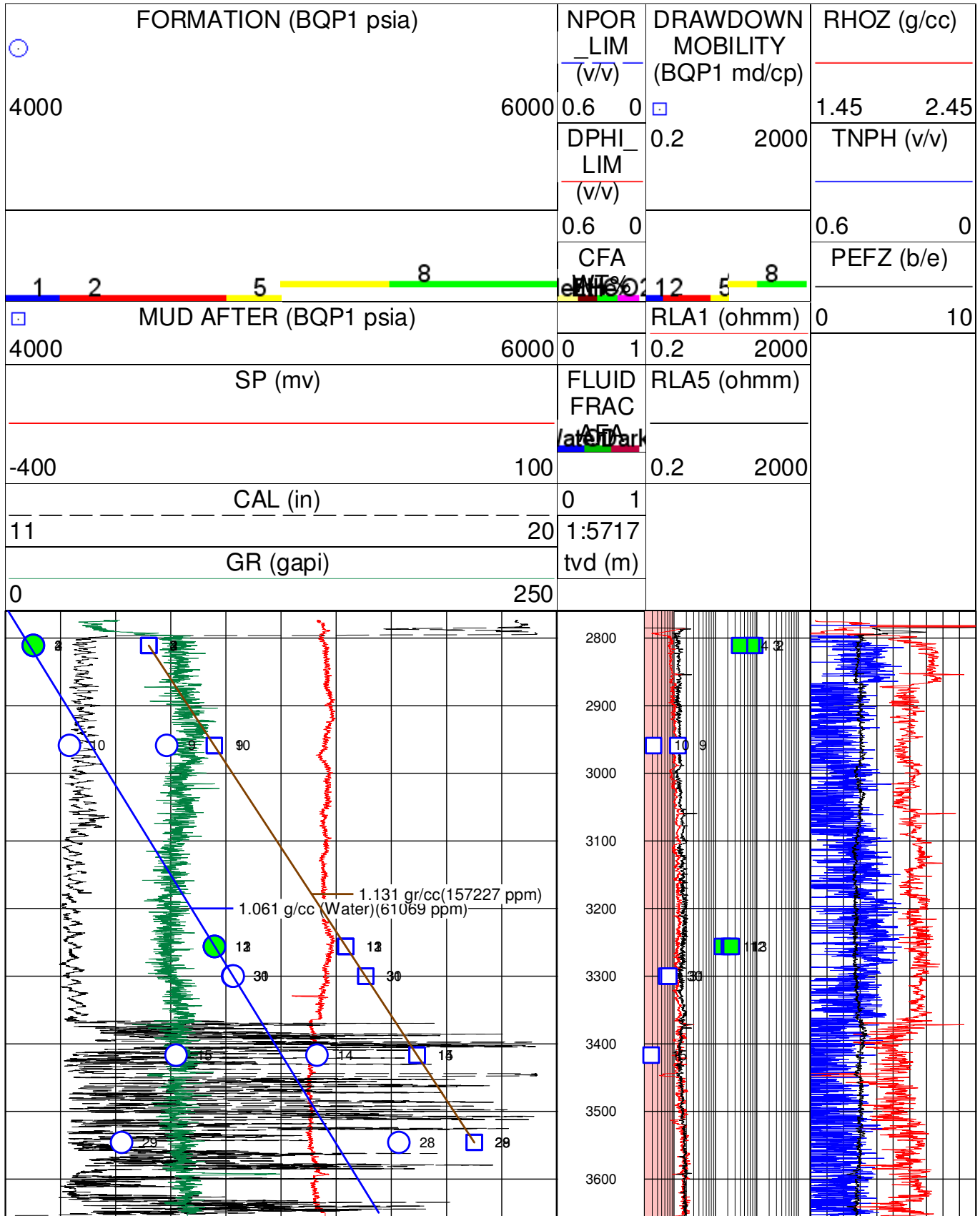
3622 m – Dual Packer Mobility Test File 73



Single Probe Pretest

- Identify supercharged pressure measurement by comparing with pressure from pretest of high mobility
- For supercharged point, last read pressure higher than estimated reservoir pressure (based on pressure trend) while pressure extrapolated at derivative plot with zero gradient (seemingly radial flow regime) is also incorrect
- Reliable probe pressure could only be obtained by referring to pretest points with high mobility

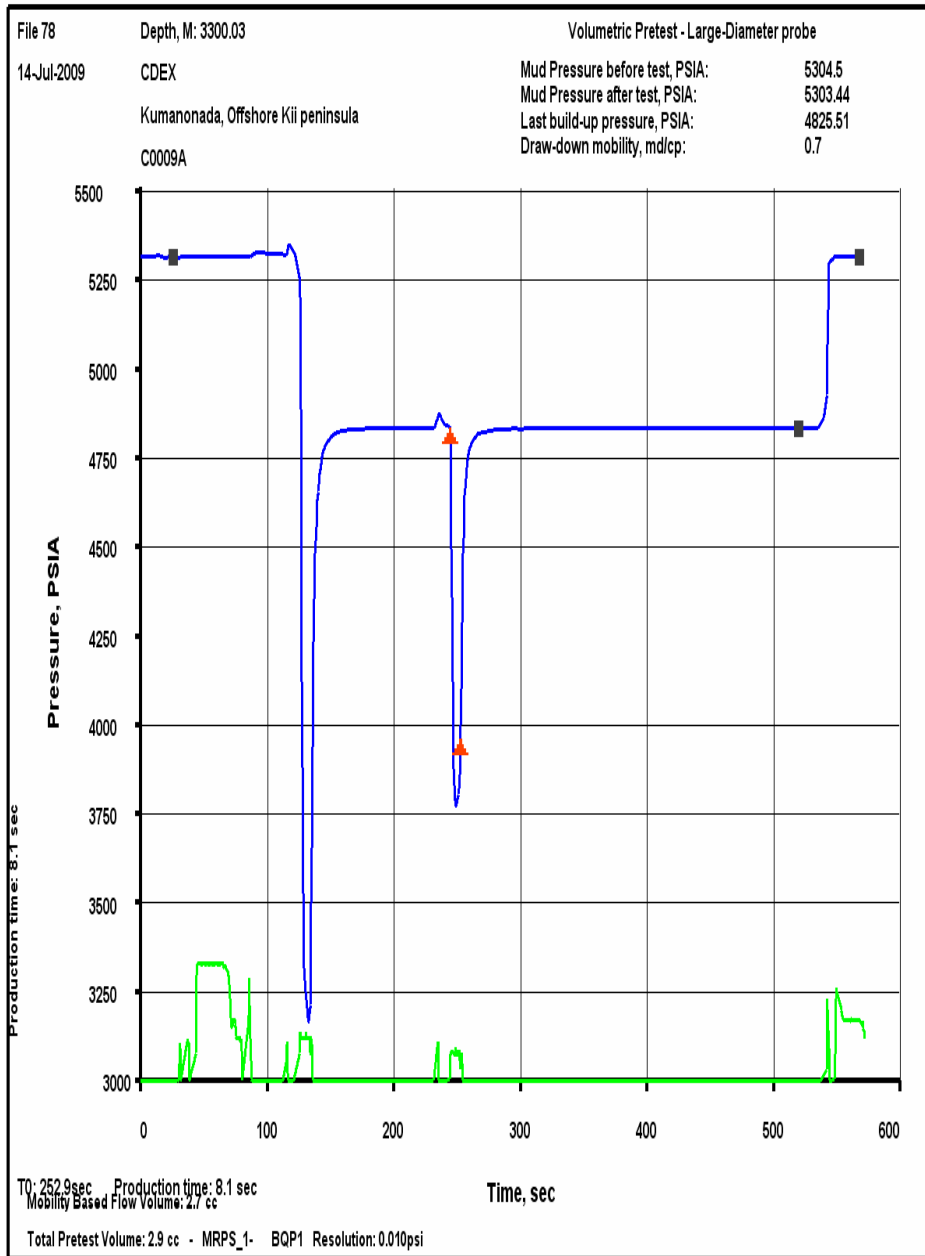
Pressure Depth Plot



C0009A

10

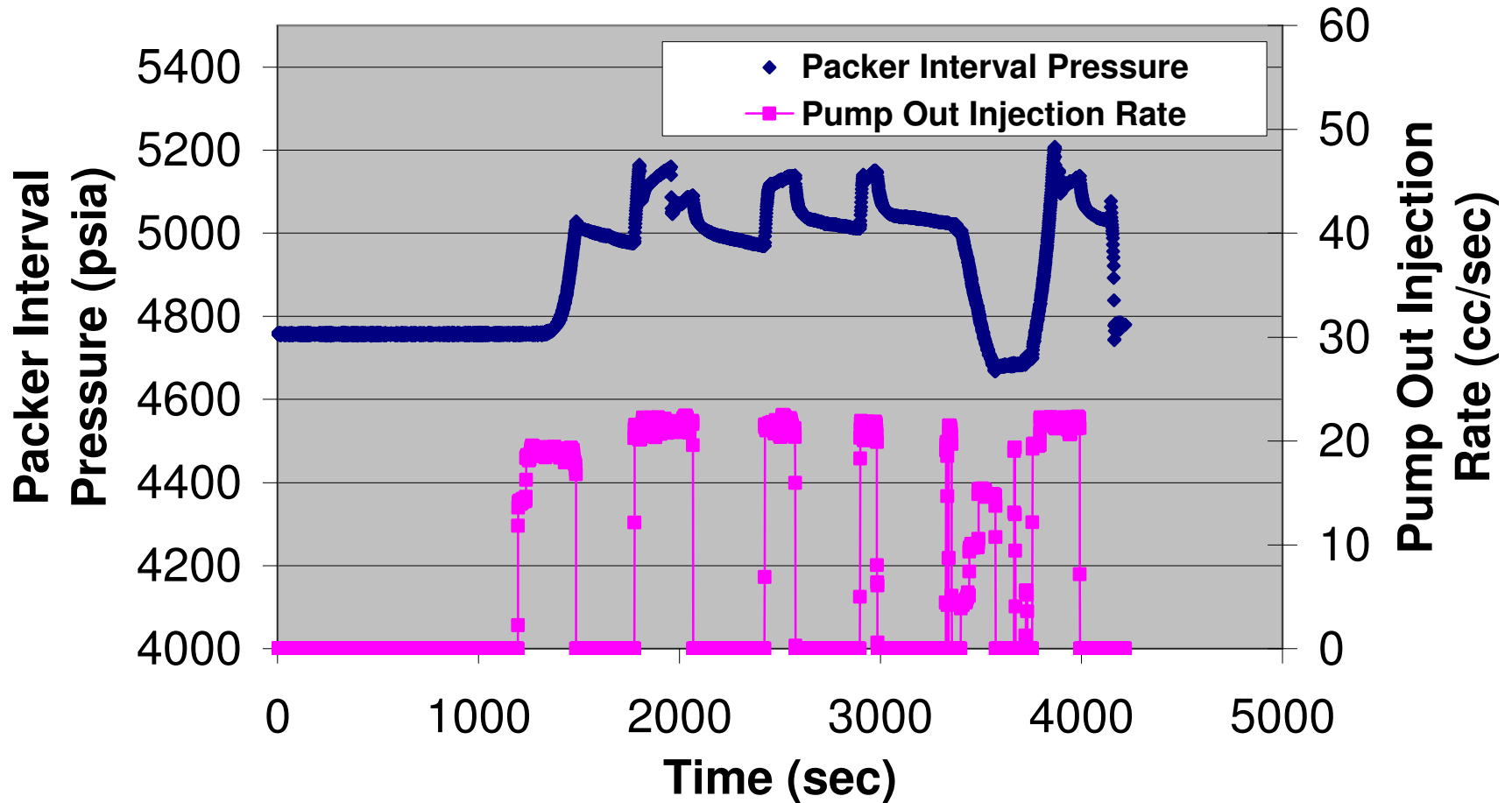
3300.03 m – Probe Pretest



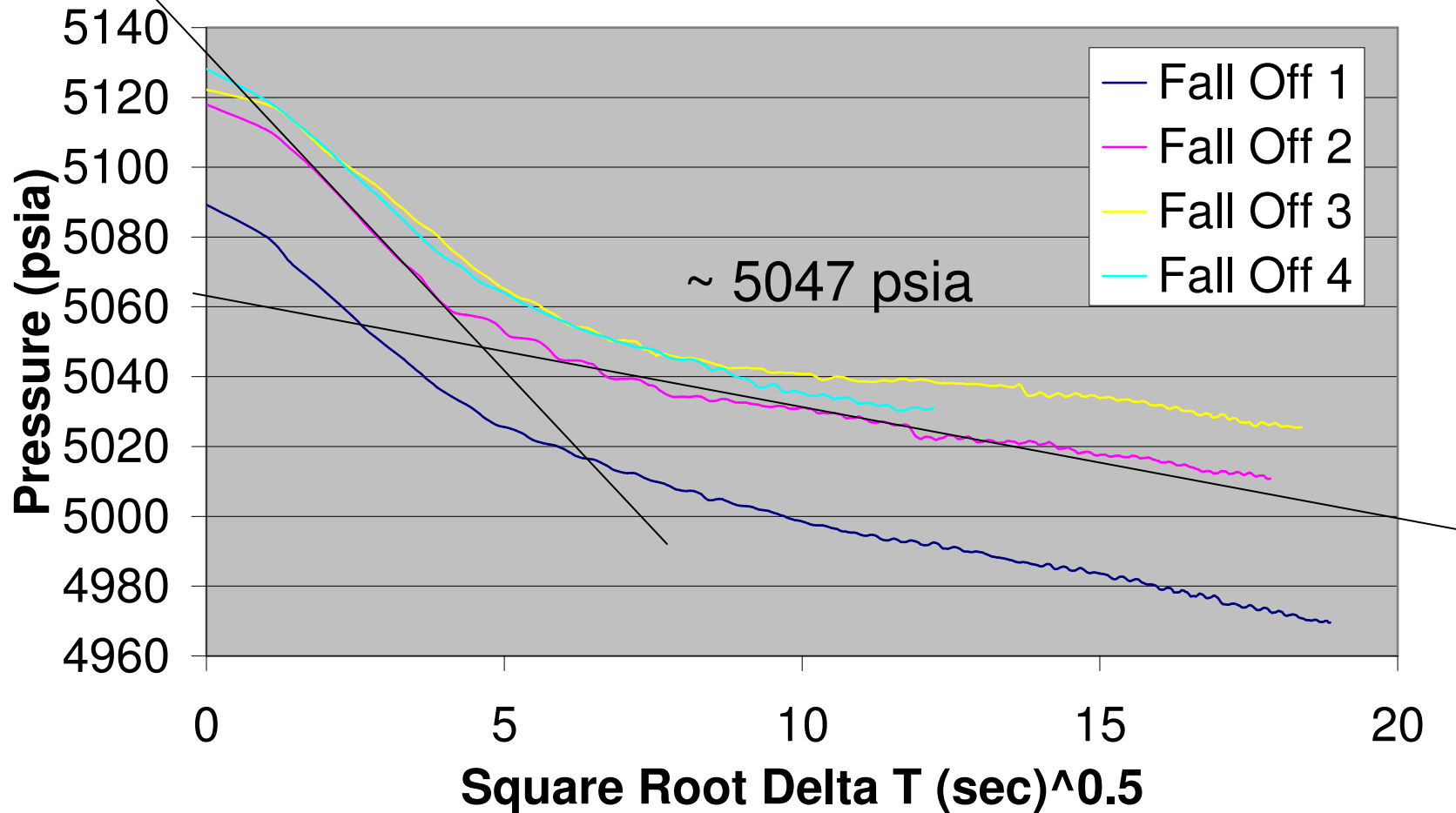
C0009A
Kumanonada, Offshore Kii
Peninsula

MDT Dual Packer Stress Test @ 3615 m

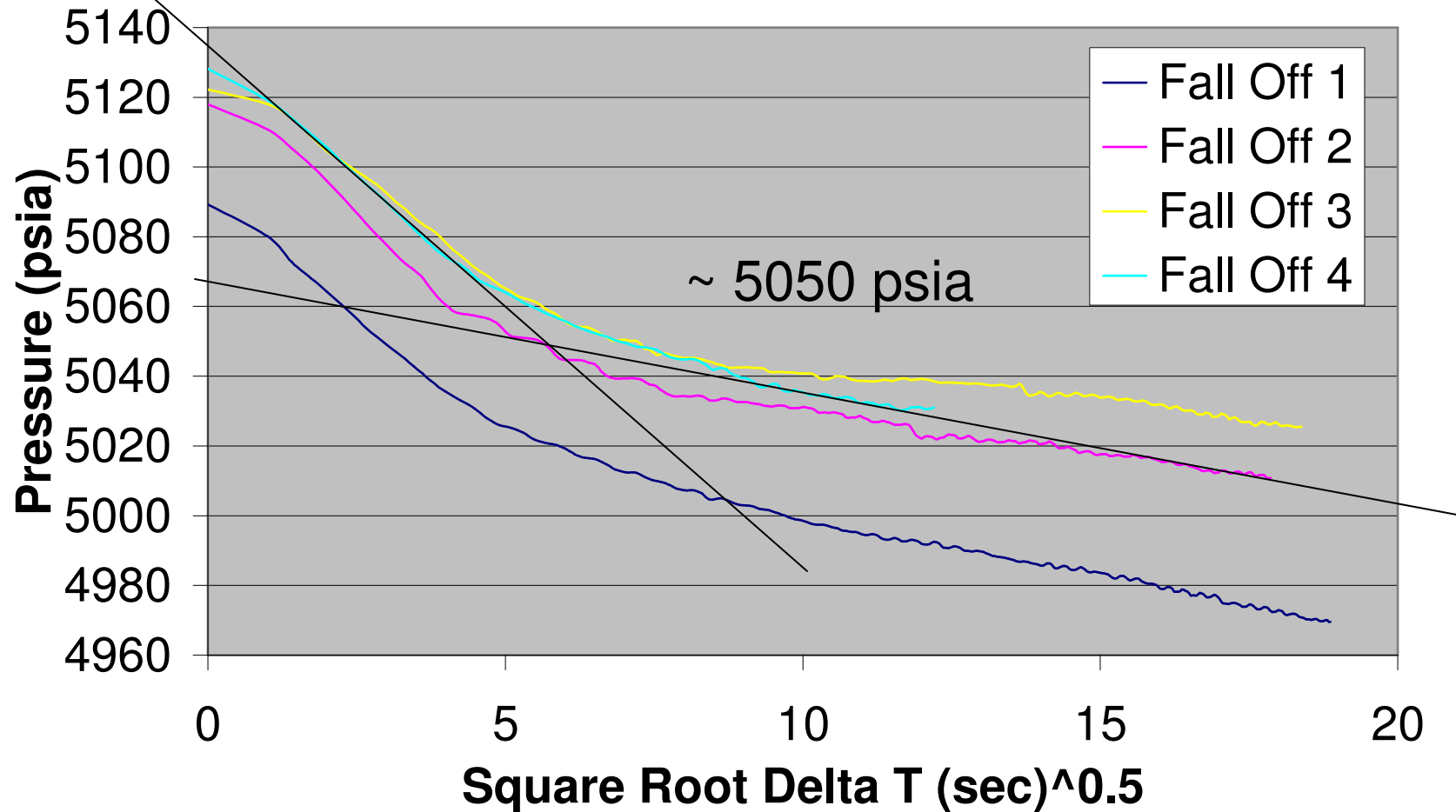
C0009A Kumanonada, Offshore Kii Peninsula 3615 m Stress Test



C0009A Kumanonada, Offshore Kii Peninsula 3615 m Stress Test (Minimum Stress 5040-5060 psia)



C0009A Kumanonada, Offshore Kii Peninsula 3615 m Stress Test (Minimum Stress 5040-5060 psia)



C0009A Kumanonada, Offshore Kii Peninsula 3615 m Stress Test (Minimum Stress 5040-5060 psia)

