3. FORMATION EVALUATION

3.1. Depth and Types of Cores and Cuttings, Well Evaluation Log and Fluid Samples

3.1.1. Drill Cores

N/A

3.1.2. Cuttings

294-297 m: DOLOMITE: light grey to grey, interbedded grey to black, microcrystalline, med hard, blocky, bedded, no visible porosity, orange to brown fluorescence, milky white acetone cut, carbonaceous, bitumen blebs, sandy in part, interbedded clay in part, minor very fine grained pyrite.

297-300 m: DOLOMITE: light grey to grey, interbedded grey to black, microcrystalline, med hard, blocky, bedded, no visible porosity, orange to brown fluorescence, milky white acetone cut, carbonaceous, bitumen blebs, sandy in part, interbedded clay in part, minor very fine grained pyrite with minor SILTSTONE: light grey, strong milky cut.

303-309 m: DOLOMITE: light grey to grey, interbedded grey to black, microcrystalline, medium hard, blocky, bedded, no visible porosity, orange to brown fluorescence, milky white acetone cut, carbonaceous, bitumen blebs, sandy in part, interbedded clay in part, trace very fine grained pyrite with minor SILTSTONE: light grey, strong milky cut.

309-312 m: DOLOMITE: light grey to grey, interbedded grey to black, microcrystalline, medium hard, blocky, bedded, no visible porosity, orange to brown fluorescence, milky white acetone cut, carbonaceous, bitumen blebs, interbedded clay in part, trace very fine grained pyrite with minor SILTSTONE: light grey, tuffaceous, strong milky cut.

312-315 m: DOLOMITE: light grey to grey, interbedded grey to black, microcrystalline, medium hard, blocky, bedded, no visible porosity, orange to brown fluorescence, milky white acetone cut, carbonaceous, bitumen blebs, interbedded clay in part, trace very fine grained pyrite.

315-330 m: DOLOMITE: grey to dark grey, hard, microcrystalline, blocky, carbonaceous, trace calcite, trace pyrite, no visible porosity, no fluorescence, milky-white acetone cut.

330-339 m: DOLOMITE: grey to dark grey, hard, microcrystalline, blocky, carbonaceous, trace calcite, trace pyrite, no visible porosity, no fluorescence, milky-white acetone cut. Minor SILTSTONE: light grey to grey, fine grained, sub-angular to sub-rounded grains, bitumen blebs.

339-348 m: SILTSTONE: grey to black, dolomitic, bitumen blebs, bedded, carbonaceous, trace pyrite, trace calcite, no visible porosity, milky white fluorescence. Minor DOLOMITE: light grey to grey, microcrystalline, no visible porosity.

348-423 m: SILTSTONE: grey to black, dolomitic, bitumen blebs, bedded, carbonaceous, trace pyrite, trace calcite, no visible porosity, milky white fluorescence. Minor DOLOMITE: light grey to dark grey, microcrystalline, no visible porosity.

423-426 m: SILTSTONE: grey to black, dolomitic, bitumen blebs, bedded, carbonaceous, trace pyrite, trace calcite, trace tuff fragments, no visible porosity, milky white fluorescence. Minor DOLOMITE: light grey to dark grey, microcrystalline, no visible porosity.

426-447 m: SILTSTONE: grey to black, dolomitic, bitumen blebs, bedded, carbonaceous, trace pyrite, trace calcite, no visible porosity, milky white fluorescence.

447-495 m: SILTSTONE: grey to black, dolomitic, bitumen blebs, bedded, carbonaceous, trace pyrite, trace calcite, no visible porosity, milky white fluorescence. Minor DOLOMITE: light grey to dark grey, microcrystalline, no visible porosity.

495-510 m: DOLOMITIC WACKESTONE: cream to grey, hard to very hard, microcrystalline, bitumen blebs, tuffaceous, with TUFFACEOUS SILTSTONE: light grey to green, dolomitic, hard to very hard, bedded, green illitic clay, arenaceous in part, bitumen blebs, minor pyrite, no visible porosity, no fluorescence, no cut, with minor DOLOMITE, grey, hard, cryptocrystalline, bitumen blebs.

510-513 m: DOLOMITIC WACKESTONE: cream to grey, hard to very hard, microcrystalline, bitumen blebs, tuffaceous, with TUFFACEOUS SILTSTONE: light grey to green, dolomitic, hard to very hard, bedded, green illitic clay, arenaceous in part, bitumen blebs, minor pyrite, no visible porosity, no fluorescence, no cut, with minor SILTSTONE: dark grey to black, carbonaceous, hard, bitumen blebs.

513-516 m: SILTSTONE: grey to black, dolomitic, bitumen blebs, bedded, carbonaceous, trace pyrite, trace calcite, no visible porosity, milky white fluorescence. Minor DOLOMITE: light grey to dark grey, microcrystalline, no visible porosity.

516-519 m: SILTSTONE: grey to black, dolomitic, hard, bedded, carbonaceous, trace pyrite, no visible porosity, bitumen blebs, no fluorescence, milky-white acetone cut, Minor dolomitic wackestone, dolomite and tuff.

519-540 m: SILTSTONE: grey to black, dolomitic, hard, bedded, carbonaceous, trace pyrite, calcareous, no visible porosity, bitumen blebs, no fluorescence, milk white acetone cut.

540-549 m: SILTSTONE: grey to black, dolomitic, hard, bedded, carbonaceous, calcareous, minor calcite fragment, trace pyrite, trace tuff, no visible porosity, no fluorescence, milky white acetone cut.

549-555 m: SILTSTONE: grey to black, dolomitic, hard, bedded, carbonaceous, calcareous, minor calcite fragment, trace pyrite, trace tuff, no visible porosity, no fluorescence, milky-white acetone cut. DOLOMITE: cream to grey, hard, calcareous.

555-579 m: SILTSTONE: grey to black, dolomitic, hard, bedded, carbonaceous, calcareous, minor calcite fragment, trace pyrite, trace tuff, no visible porosity, no fluorescence, milky white acetone cut.

579-594 m: SILTSTONE: grey to black, dolomitic, hard, bedded, carbonaceous, calcareous, moderate calcite fragment, trace pyrite, trace tuff, no visible porosity, no fluorescence, milky white acetone cut. DOLOMITE: cream to light grey brown, hard, calcareous (yellow mineral fluorescence), calcareous breccia to 20%, bitumen blebs with siltstone fragments.

594-603 m: SILTSTONE: grey to black, dolomitic, hard, bedded, carbonaceous, calcareous, moderate calcite fragment, trace pyrite, trace tuff, no visible porosity, no fluorescence, milky white acetone cut. DOLOMITE: cream to light grey brown, hard, calcareous (yellow mineral fluorescence), trace tuff, light green, trace galena, calcareous breccia increasing to 30%, bitumen blebs with siltstone fragments.

603-618 m: SILTSTONE: grey to black, dolomitic, hard, bedded, carbonaceous, calcareous, moderate calcite fragment, trace pyrite, trace tuff, no visible porosity, no fluorescence, milky white acetone cut. DOLOMITE: cream to light grey brown, hard, calcareous (yellow mineral fluorescence), increasing pyrite (5%) & galena, calcareous breccia increasing to 30%, bitumen blebs with siltstone fragments.

618-642 m: SILTSTONE: black to dark grey, dolomitic, hard, blocky, bedded, moderate pyrite, trace galena, calcareous, trace calcite, no visible porosity, no fluorescence, milky white cut.

642-648 m: SILTSTONE: black to dark grey, dolomitic, hard, blocky, bedded, moderate pyrite, trace galena blebs to 1 mm, calcareous, trace calcite, no visible porosity, no fluorescence, milky white cut.

648-651 m: SILTSTONE: black to dark grey, dolomitic, hard, blocky, bedded, moderate pyrite, trace galena blebs to 1 mm, calcareous, trace calcite, no visible porosity, no fluorescence, milky white cut. GLYDE #1 ST1 - CAN #08 (desorption sample) 649 m (06:00, 10/8/2012).

651-666 m: SILTSTONE: black to dark grey, fine good, hard, bedded, moderate pyrite, calcareous, trace calcite, no visible porosity, dull milky white cut, breccia dolomite fragment DOLOMITE: light brown white, sugary texture, calcareous, trace cubic pyrite, partly bright yellow fluorescence, visible porosity.

666-672 m: SILTSTONE: black to dark grey, fine good, hard, bedded, moderate pyrite, calcareous, trace calcite, no visible porosity, milky white cut. DOLOMITE: light brown white, sugary texture, calcareous, partly bright yellow fluorescence, visible porosity.

672-678 m: DOLOMITE: light brown white, sugary texture, calcareous, partly bright yellow fluorescence, visible porosity.

678-684 m: SILTSTONE: black to dark grey, fine good, hard, bedded, moderate pyrite, calcareous, trace calcite, no visible porosity, milky white cut. DOLOMITE: light brown white, sugary texture, calcareous, partly bright yellow fluorescence, visible porosity.

684-687 m: SILTSTONE: black to dark grey, fine good, hard, bedded, moderate pyrite, calcareous, trace calcite, no visible porosity, milky white cut. DOLOMITE: light brown white, sugary texture, calcareous, partly bright yellow fluorescence, visible porosity. GLYDE #1 ST1 - CAN #09 (desorption sample) 686 m (17:00, 10/8/2012).

687-690 m: SILTSTONE: black to dark grey, fine good, hard, bedded, moderate pyrite, calcareous, trace calcite, no visible porosity, milky white cut. DOLOMITE: light brown white, sugary texture, calcareous, partly bright yellow fluorescence, visible porosity.

690-720 m: DOLOMITE: light brown white, sugary texture, calcareous, partly bright yellow fluorescence, visible porosity, milky white cut.

720-768 m: DOLOMITE: light brown white, sugary texture, calcareous, white chalcedony, partly bright yellow fluorescence, visible porosity, milky white cut.

768-789 m: SILTSTONE: black to dark grey, hard, bedded, trace pyrite, calcareous, trace calcite, no visible porosity, milky white cut. DOLOMITE: light brown white, sugary texture, calcareous, visible porosity, milky white cut.

789-810 m: SILTSTONE: black to dark grey, hard, bedded, trace pyrite, calcareous, trace calcite, no visible porosity, milky white cut.

810-813 m: SILTSTONE: black to dark grey, hard, bedded, trace pyrite, calcareous, trace calcite, no visible porosity, milky white cut. DOLOMITE: light brown white, sugary texture, calcareous, visible porosity, milky white cut.

813-837 m: SILTSTONE: black to dark grey, hard, bedded, trace pyrite, calcareous, trace calcite, no visible porosity, milky white cut.

837-840 m: SILTSTONE: black to dark grey, hard, bedded, trace pyrite, calcareous, trace calcite, no visible porosity, milky white cut. GLYDE #1 ST1 - CAN #10 (desorption sample) 829 m to 839 m (14:00, 13/8/2012).

3.1.3. Well evaluation logs

Quad-combo (GR-DEN-RT-SGS); FMI & cross-dipole sonic

3.1.4. Fluid samples

No fluid samples were taken from the well during drilling operations.

3.2. Hydrocarbon Indications

Gas shows were recorded on mud-logs and bright yellow fluorescence and occasional cuts from residual oil legs, bitumen, and pyro-bitumen in the Barney Creek Formation and Coxco Dolomite.

3.3. Operation and Results including full raw pressure-time listings for all formation fluid sample tests and production tests carried out

Well Test Analysis Results – Glyde #1 ST1 Flow Test, 10 August 2012

A well test was conducted in a 'brecciated' Coxco Member of the Teena Formation and the results below were reported to the Minister. Ref: *EP171-XPN-DRL-PRP-004-RevC-Glyde1-ST1-Addendum1*.

Conducted a pressure build up test, monitored the shut-in casing pressure (SICP) until the pressure stabilized.

Table 4: Shut-in Casing Pressures.

Event	Time (hh:mm)	SICP [psi]
Shut-in start time	18:30	150
Shut-in end time	20:30	550

Diverted the well to the choke and pressures were recorded regularly during the flow test as follows:

Table 5: Flow Test Data.

Event	Time (hh:mm)	Rate [mscf/day]	Surface Pressure [psi]	Choke Size (64ths) [in]
Flow start time	20:33			
Test Flow Period 1, 1 min	20:33	833,000	550	16
Test Flow Period 1, 2 min	20:34	747,000	492	16
Test Flow Period 1, 4 min	20:37	723,000	476	16
Test Flow Period 1, 6 min	20:39	713,000	469	16
Test Flow Period 1, 8 min	20:41	698,000	464	16
Test Flow Period 1, 10 min	20;43	693,000	459	16
Test Flow Period 1, 12 min	20:45	691,000	455	16
Test Flow Period 1, 15 min	20:48	690,000	453	16
Start shut-in pressure	20:50			
Shut-in Period 1, 1 min	20:51		467	
Shut-in Period 1, 2 min	20:52		486	
Shut-in Period 1, 4 min	20:54		507	
Shut-in Period 1, 6 min	20:56		517	
Shut-in Period 1, 8 min	20:58		523	
Shut-in Period 1, 10 min	21:00		529	
Shut-in Period 1, 12 min	21:02		533	
Shut-in Period 1, 15 min	21:05		537	
Shut-in Period 1, 20 min	21:10		544	
Shut-in Period 1, 25 min	21:15		549	
Final shut-in Period 1, 30 min	21:20		554	
Start Flow Period 2	21:25	838,000	558	

Flow Period 2, 1 min	21:26	796,000	525	
Flow Period 2, 2 min	21:27	760,000	501	
Flow Period 2, 4 min	21:29	722,000	475	
Flow Period 2, 6 min	21:31	701,000	461	
Flow Period 2, 8 min	21:33	688,000	452	
Flow Period 2, 10 min	21:35	676,000	444	
Flow Period 2, 12 min	21:37	669,000	439	
Flow Period 2, 15 min	21:40	659,000	432	
Flow Period 2, 20 min	21:45	647,000	424	
Flow Period 2, 25 min	21:50	636,000	417	
Final Flow Period 2, 30 min	21:55	629,000	412	
Shut-in pressure			412	

All data from air flow, chromatograph data, and above flow test data were correlated with Pason drilling pressure data to create flowing rate and pressure data for transient pressure data analysis.

The attached data (**See Figure 5**) was analysed in Fekete's WellTest™ Version 7.5.2.211 software using a horizontal well transient model. An arbitrary drainage area of 65 acres was used as the initially input. It should be noted that at no time did the test pressures indicate a boundary condition could be imposed and was therefore 'infinite acting'. The input boundary conditions were based on minimum area based on final interpretation Glyde#1 and Glyde#1ST1 cross section and stratigraphy/structure mapping. The results interpretations, parameters and plots are outlined below.

Gas Model - Horizontal 1

Analysis Results

Effective Permeability in X Direction (k_x)	1.4000 md
Effective Permeability in Y Direction (k_y)	3.8000 md
Effective Permeability in Z Direction (k_z)	0.3050 md
Total Skin (s')	0.000
Skin Due to Damage (s_d)	0.609
Wellbore Volume (V_w)	64 bbl
Dim. Wellbore Storage Constant (C_D)	272.031

Effective Wellbore Length (L_e)	81.515 ft
Reservoir Length (X_e)	1181.000 ft
Reservoir Width (Y_e)	2395.000 ft
Well Location X-Direction (X_w)	359.300 ft
Well Location Y-Direction (Y_w)	1368.000 ft
Well Location Z-Direction (Z_w)	15.500 ft
X Distance to Observation Point (ΔX_O)	0.000 ft
Y Distance to Observation Point (ΔY_O)	0.000 ft
Distance to Observation Well from Top of Zone (Z_O)	16.250 ft

Reservoir Parameters

Net Pay (h)	32.500 ft
Total Porosity (ϕ_t)	14.00 %
Gas Saturation (S_g)	68.00 %
Oil Saturation (S_o)	0.00 %
Water Saturation (S_w)	32.00 %
Formation Compressibility (c_f)	7.0000e-06 1/psi
Total Compressibility (c_t)	1.0396e-03 1/psi
Wellbore Radius (r_w)	0.260 ft

Production and Pressures

Final Gas Rate ($q_{g\ final}$)	0.640 MMscfd
Total Cumulative Production Gas (Cum_{gas})	0.504 MMscf
Final Flowing Pressure (p_{wfo})	550.5 psi(a)
Final Measured Pressure (p_{last})	113.5 psi(a)

Fluid Properties

Reservoir Temperature (T_{resv})	112.0 °F
Reservoir Pressure (p_{resv})	736.0 psi(a)
Gas Gravity (γ_g)	0.723
N_2	0.00 %
CO_2	0.00 %
H_2S	0.00 %
Critical Temperature (T_c)	383.0 °R
Critical Pressure (p_c)	660.0 psi(a)
Gas Viscosity (μ_g)	0.0120 cP
Gas Compressibility (c_g)	1.5171e-03 1/psi
Gas Compressibility Factor (z)	0.861
Gas Formation Volume Factor (B_g)	3.4711e-03 bbl/scf
Gas Correlation	B.W.R. (Table)
Gas Viscosity Correlation	Carr et al

Synthesis Results

Average Error (E_{avg})	101.01 %
Synthetic Initial Pressure (p_i (syn))	736.0 psi(a)
Final Average Reservoir Pressure (p_{avg})	735.3 psi(a)
Pressure Drop Due to Total Skin (Δp_{skin})	0.0 psi(a)
Flow Efficiency (FE)	1.000
Damage Ratio (DR)	1.000

Figure 5: Fekete's WellTest™ Version 7.5.2.211 reservoir parameters.

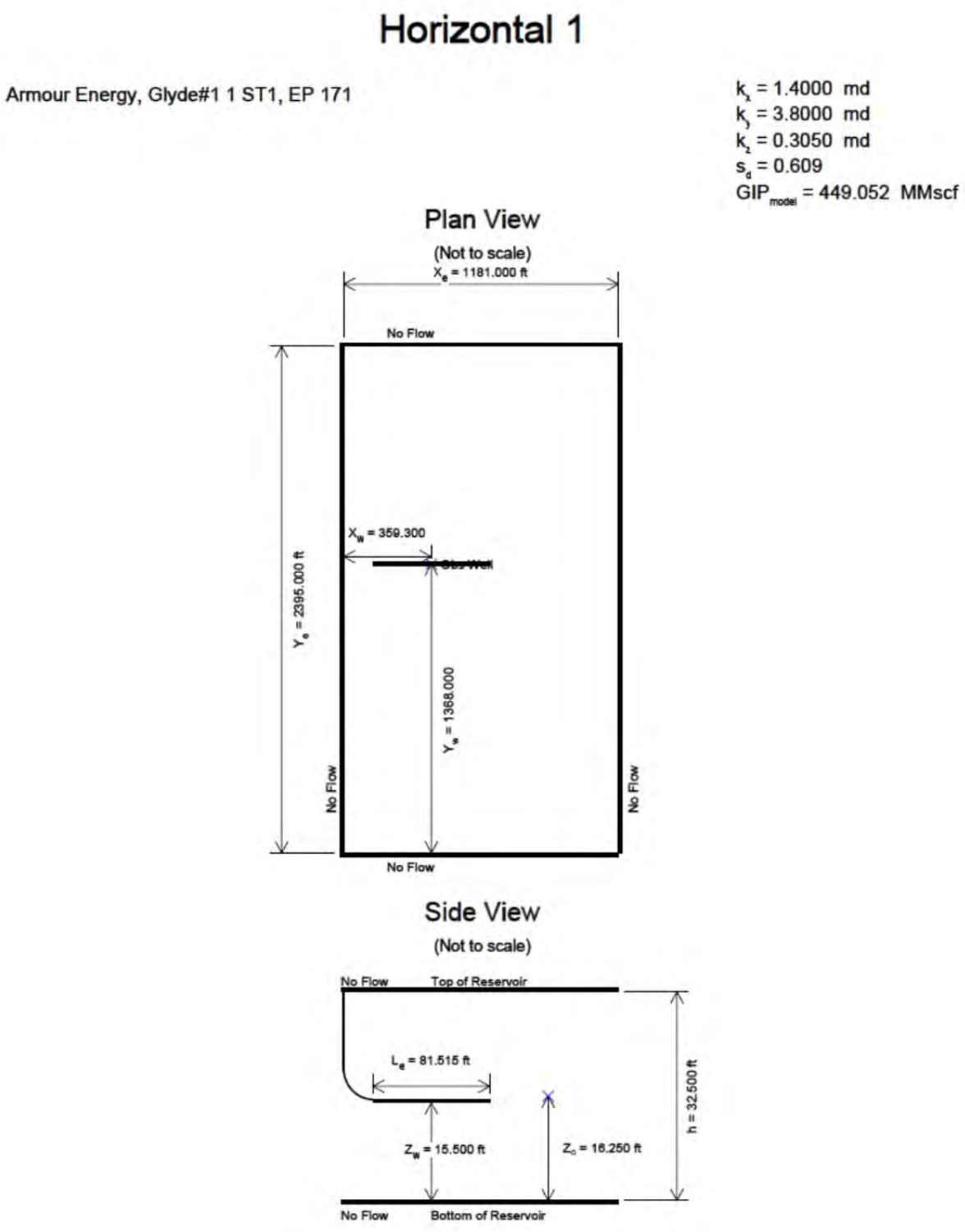

Figure 6: GIP reservoir parameters.

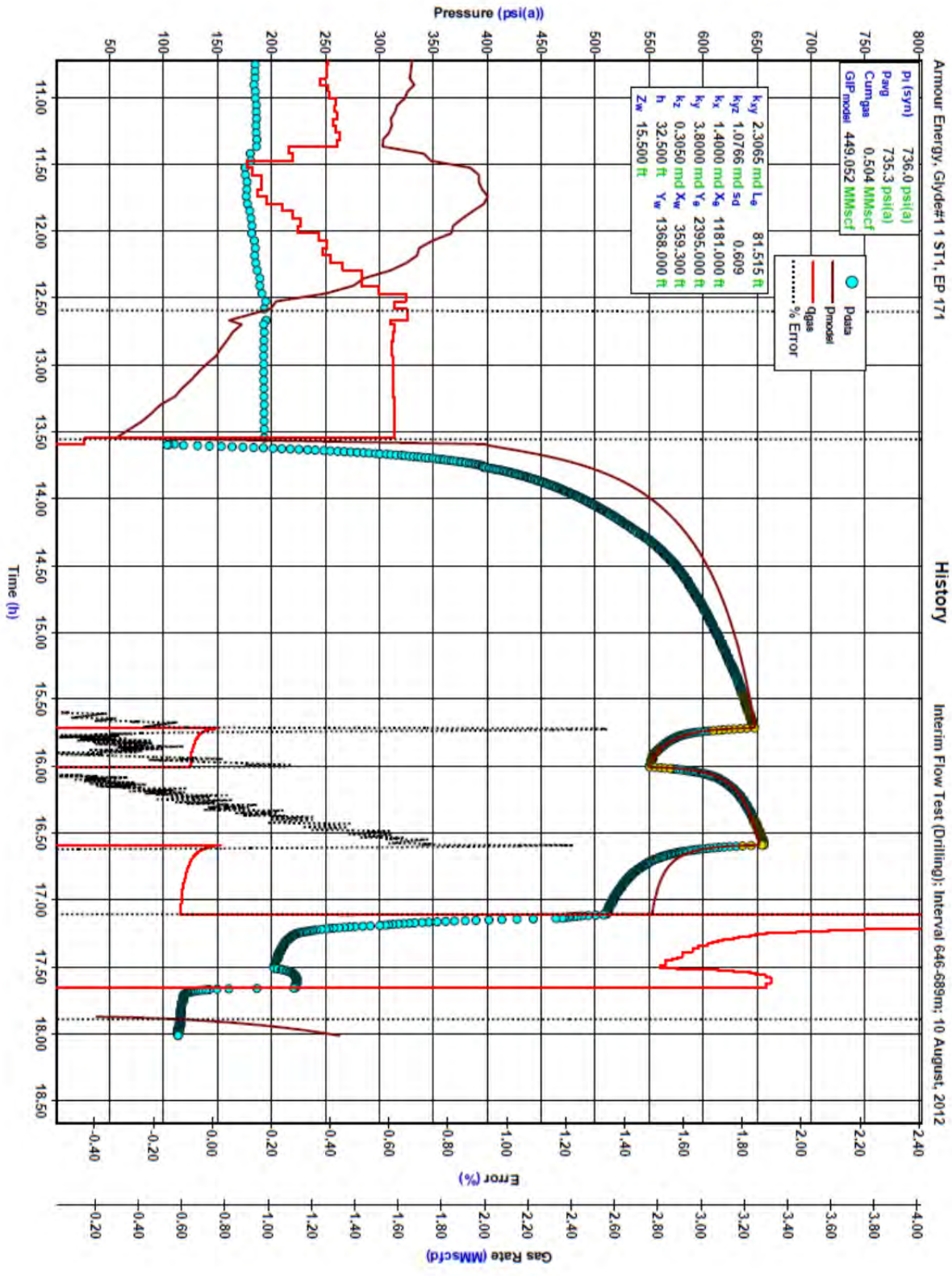

Figure 7: Flow test (646 m - 689 m).

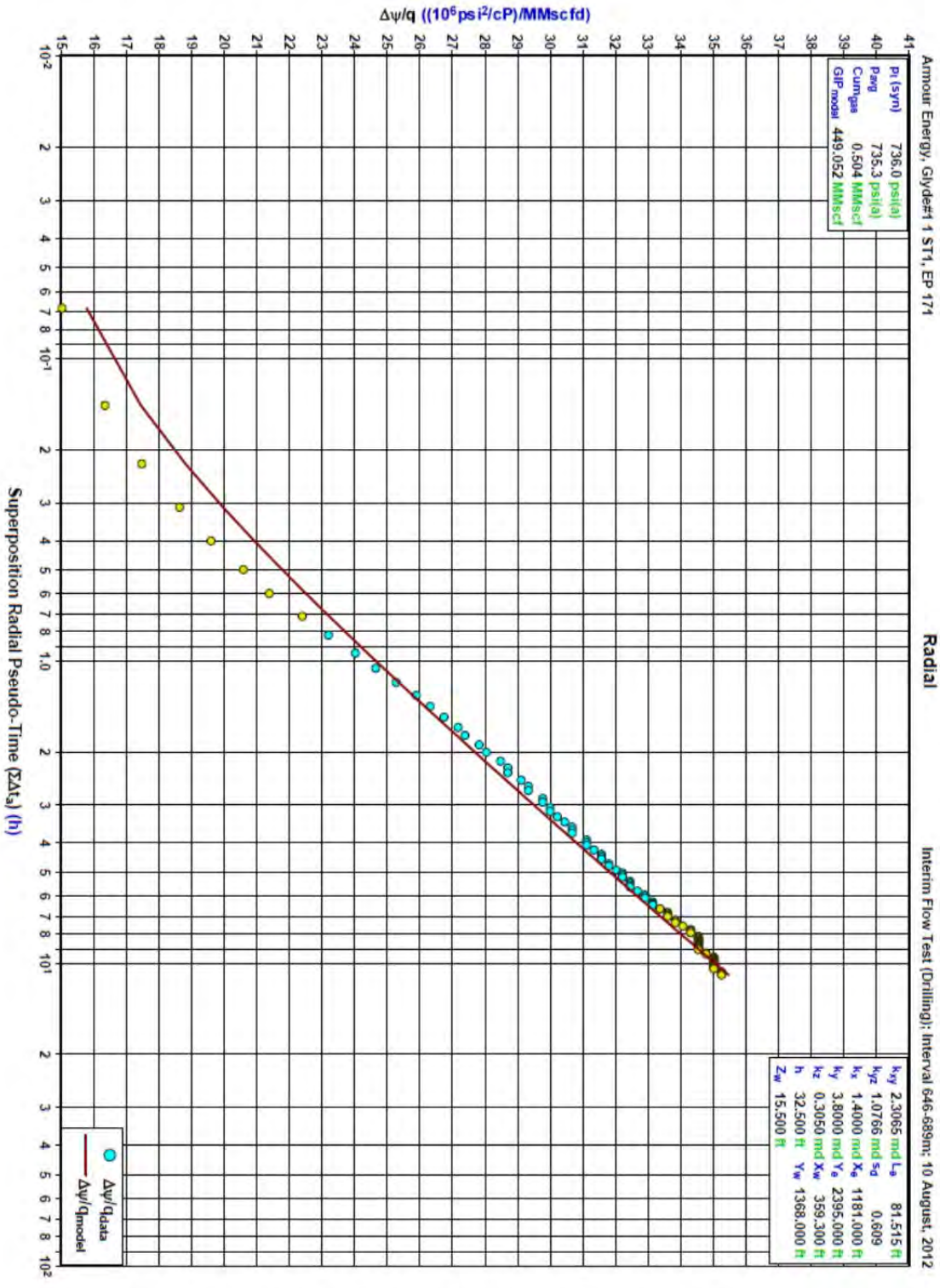

Figure 8: Radial curve (646 m - 689 m).

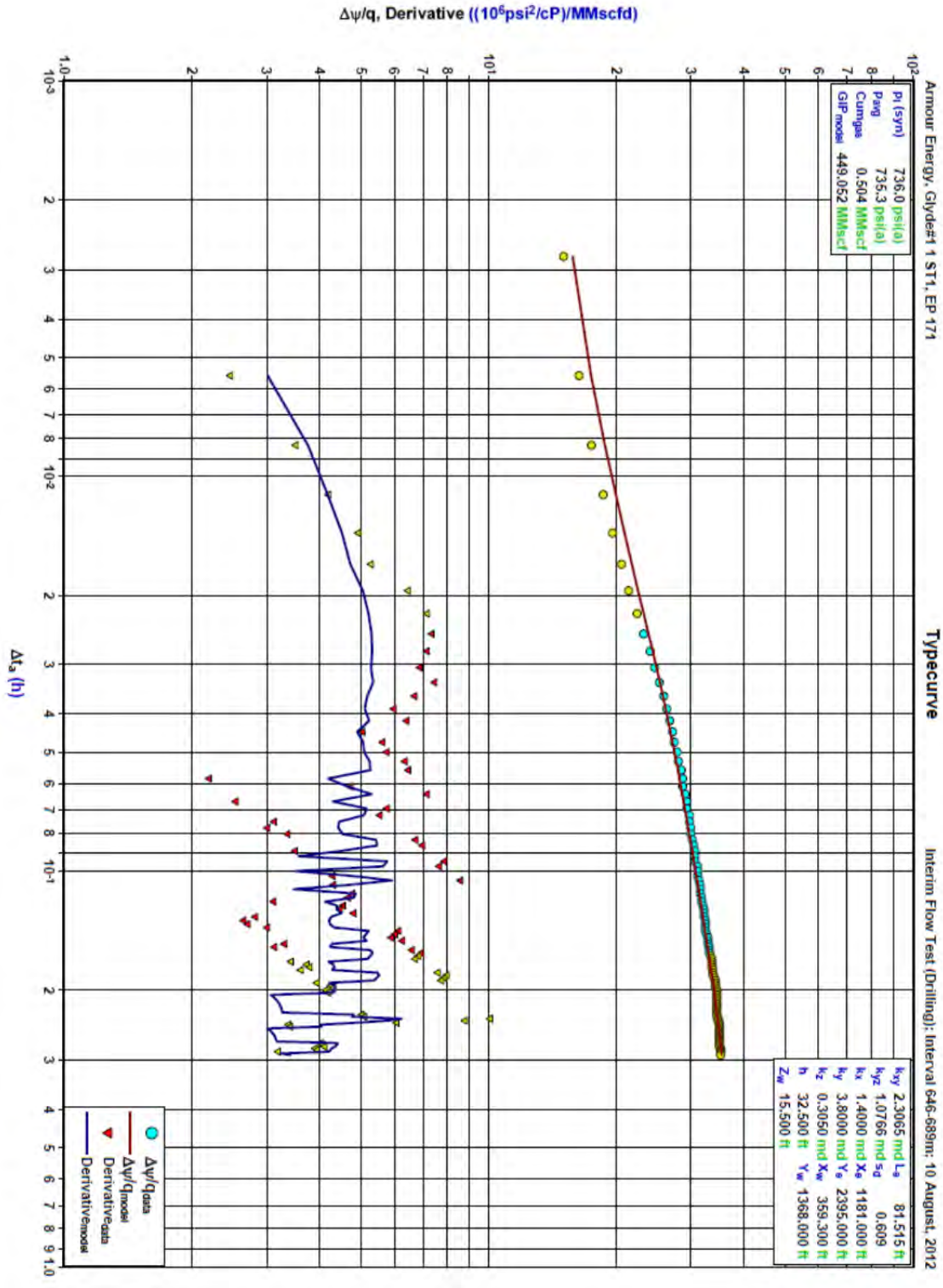

Figure 9: Type curve (646 m - 689 m).