

CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES

CNWRA
CONTROLLED
COPY 569

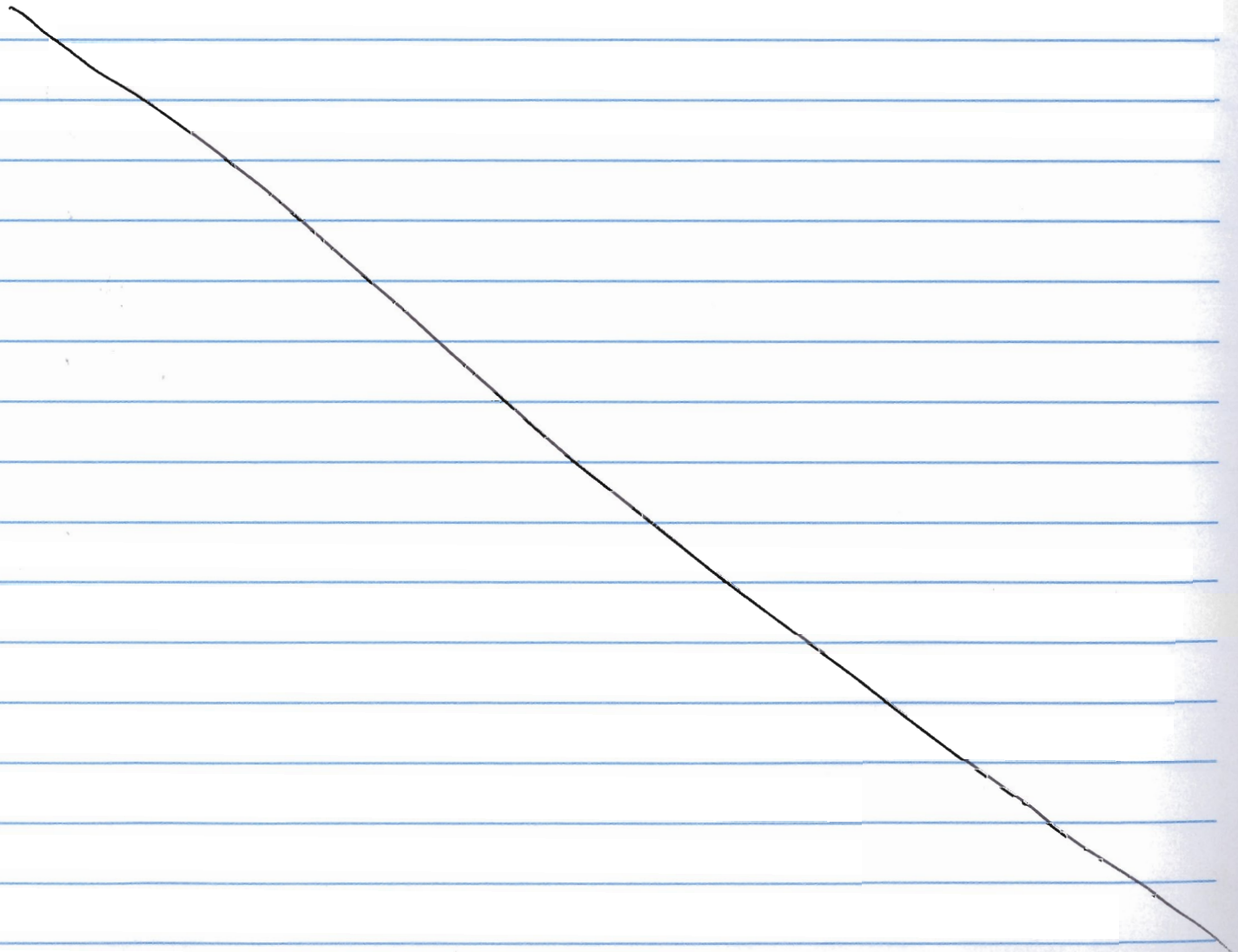
This is a continuation of the CNWBA controlled scientific notebook #568, titled;

"Analysis of Escalante, Utah Permeability Data for High Velocity Flow Effects"

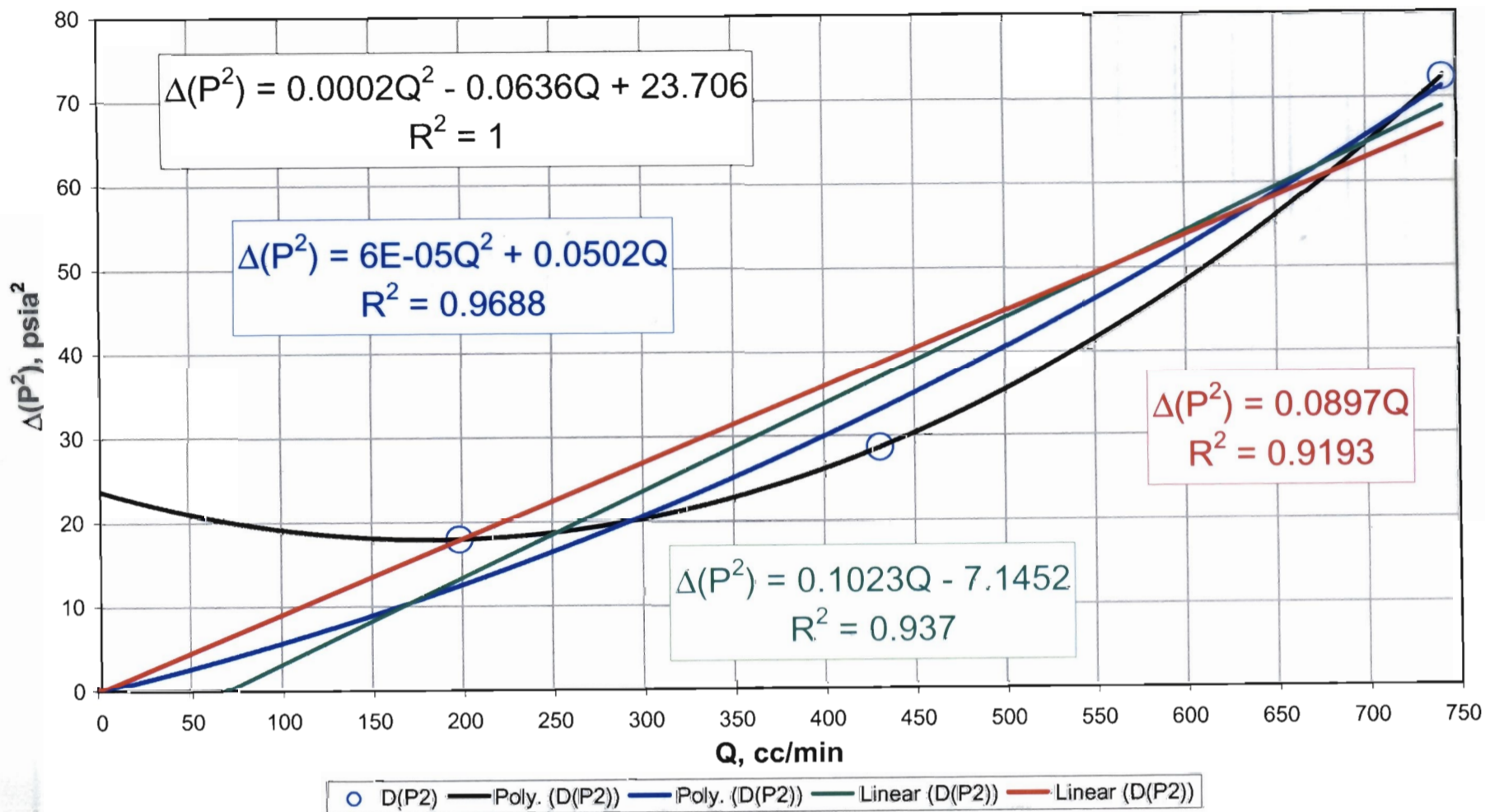
Participating individuals: Cynthia L. Dinwiddie (502-6085)
Ronald N. McGinnis (502-5825)

Contract No. Project: 06002.01.131

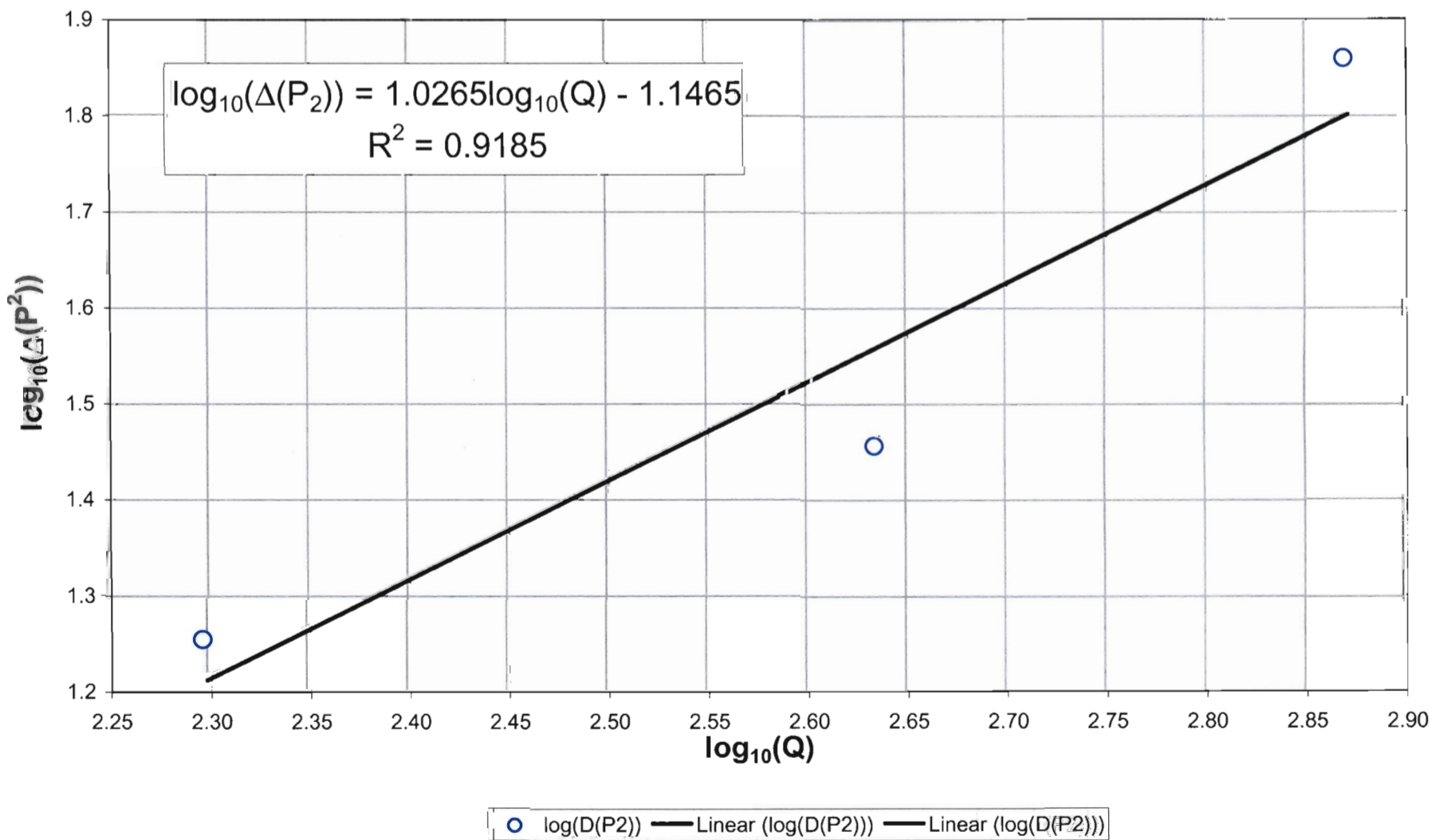
Task Objective may be found in SN 537+545



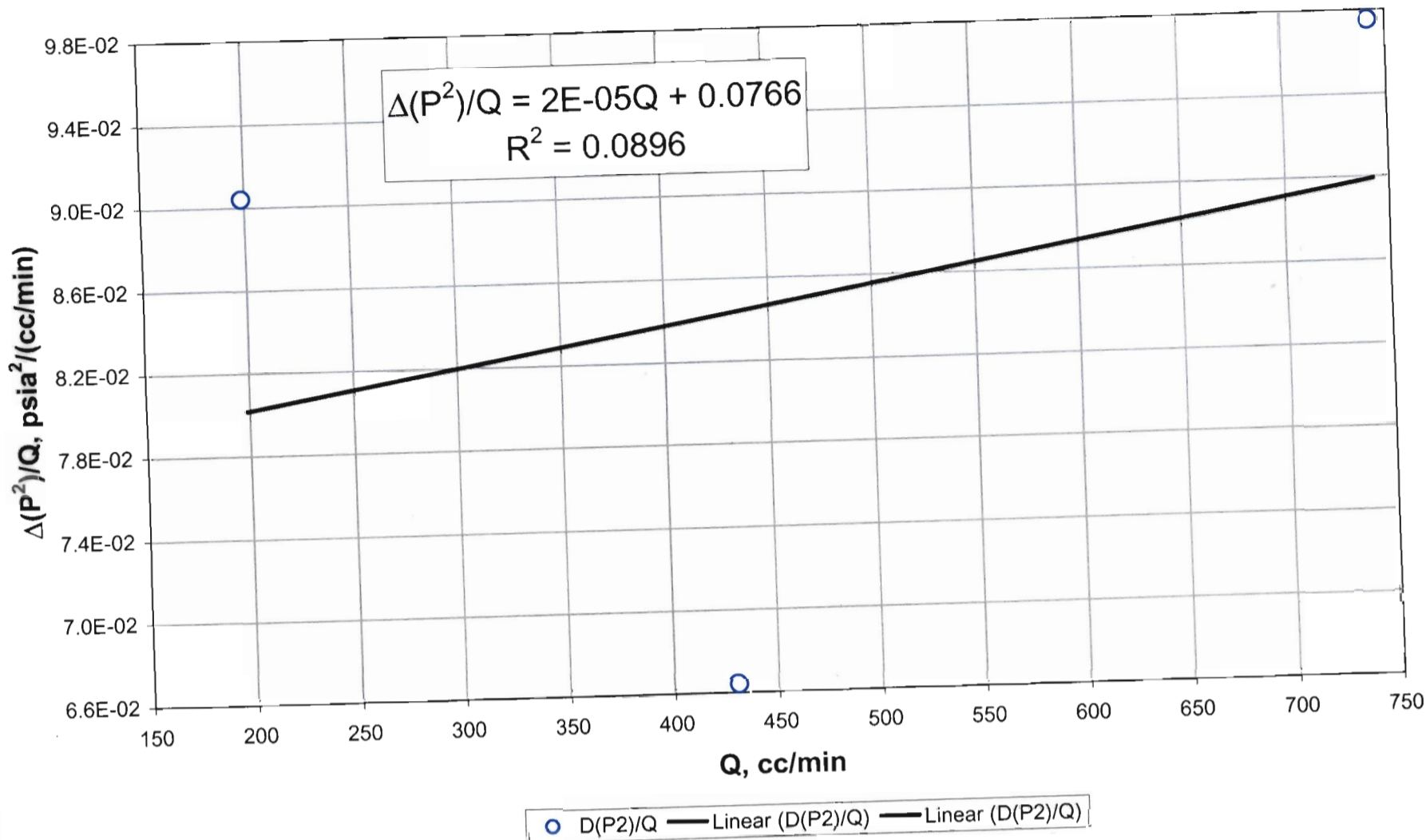
Relationship between steady-state differential pressures squared and flowrate:
 If relationship is linear, with the ordinate intercept nearly zero,
 there is no high velocity flow effect.
 V2 Transect: Drillhole 10



Log-Log plot of differential pressures squared vs. flowrate--used to identify the presence of
 high-velocity flow effects (when the slope is greater than unity)
 V2 Transect: Drillhole 10

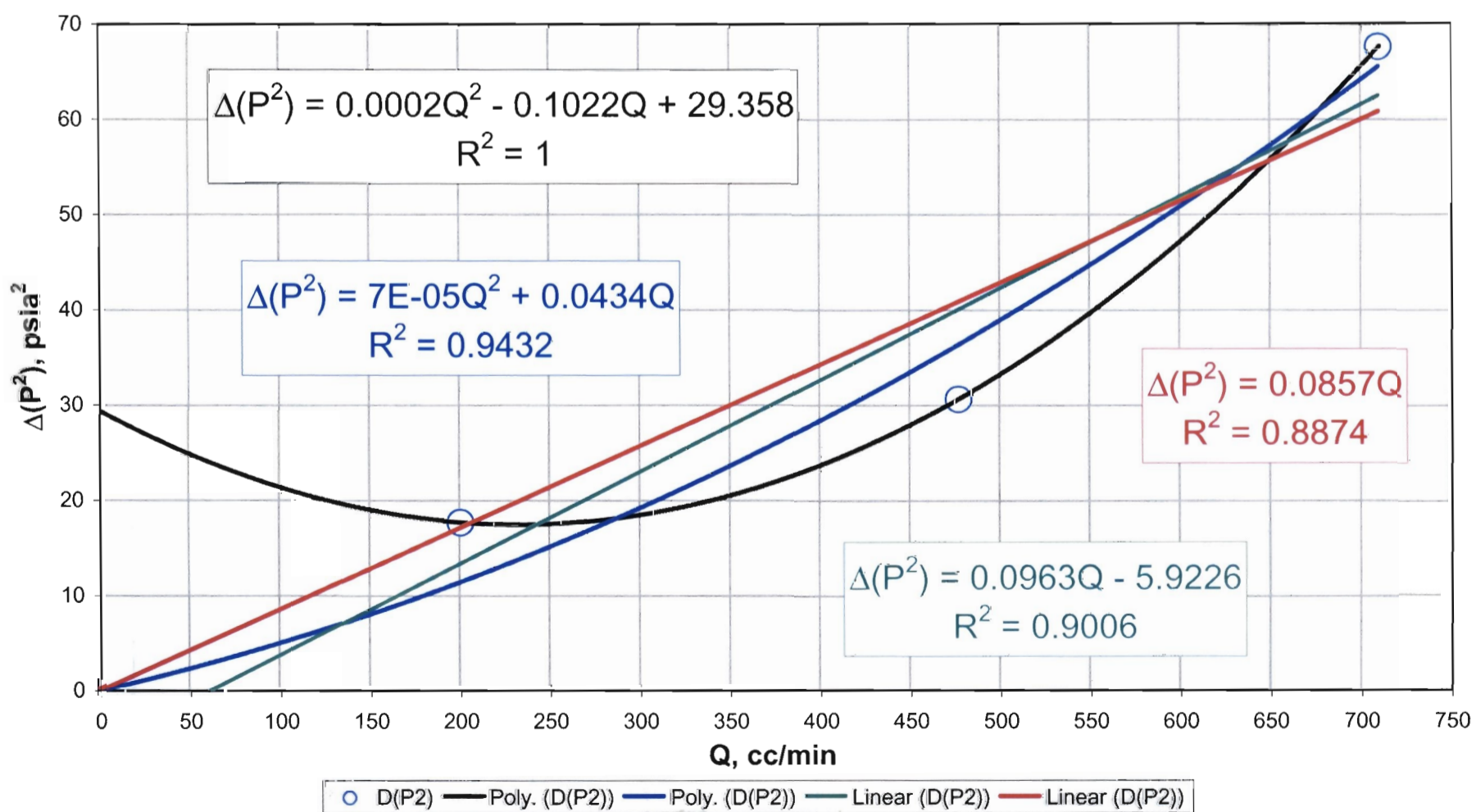


Final check for high velocity flow effects:
 High velocity flow effects are present when the slope is non-zero and positive.
 V2 Transect: Drillhole 10



RNM, 01/28/03

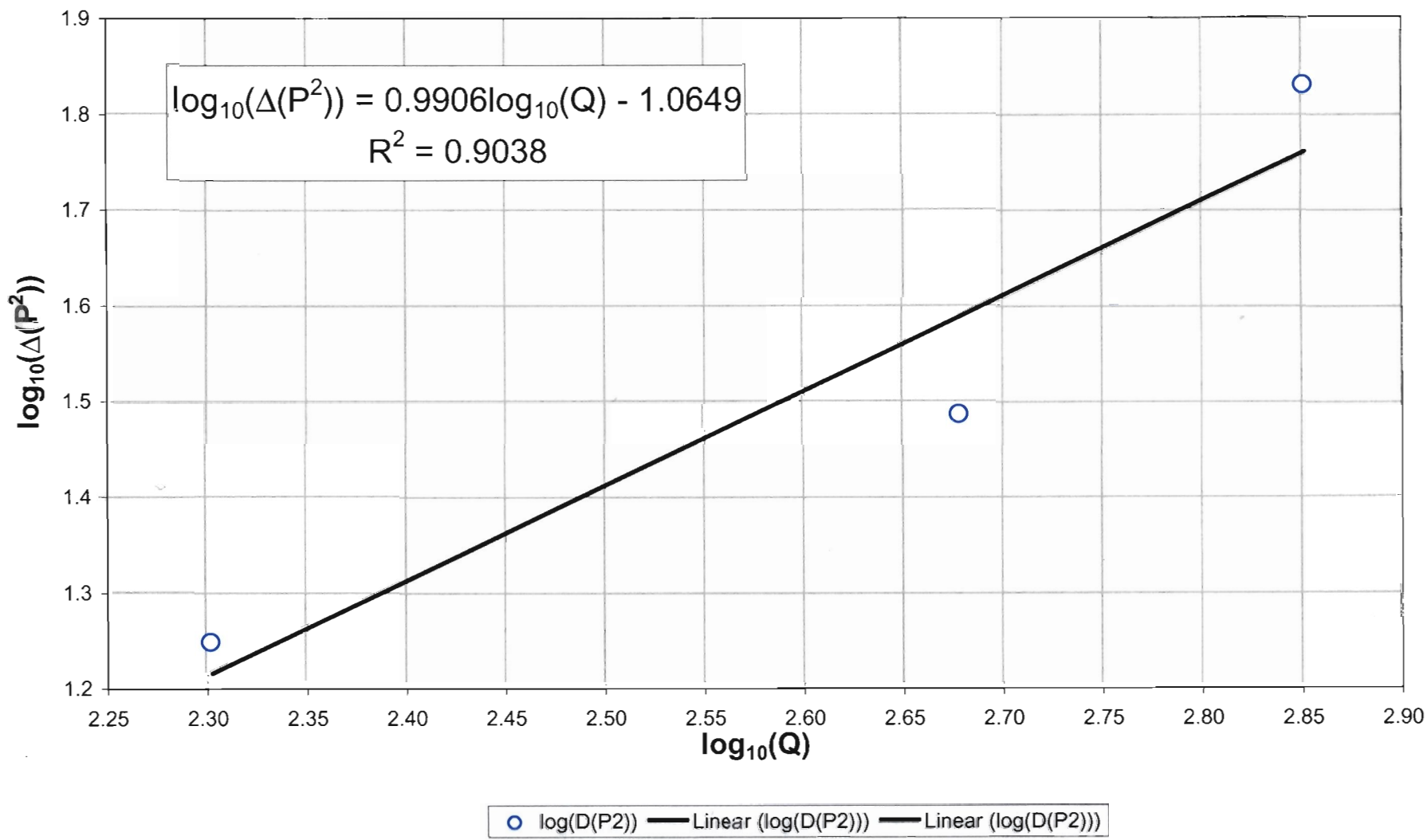
Relationship between steady-state differential pressures squared and flowrate:
 If relationship is linear, with the ordinate intercept nearly zero,
 there is no high velocity flow effect.
 V2 Transect: Drillhole 11



RNM, 01/28/03

Log-Log plot of differential pressures squared vs. flowrate--used to identify the presence of high-velocity flow effects (when the slope is greater than unity)

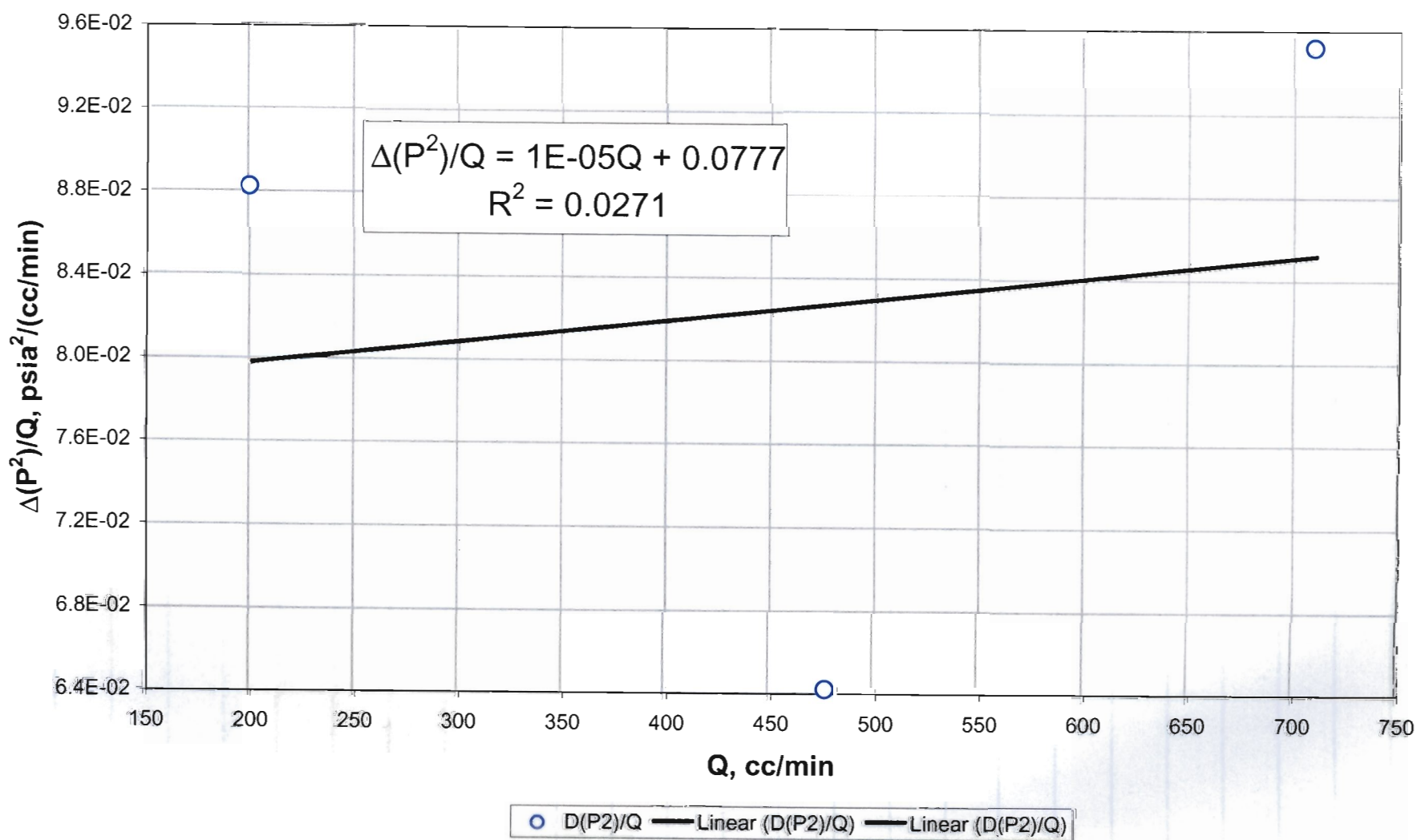
V2 Transect: Drillhole 11



Rmn, 01/28/03

Final check for high velocity flow effects: High velocity flow effects are present when the slope is non-zero and positive.

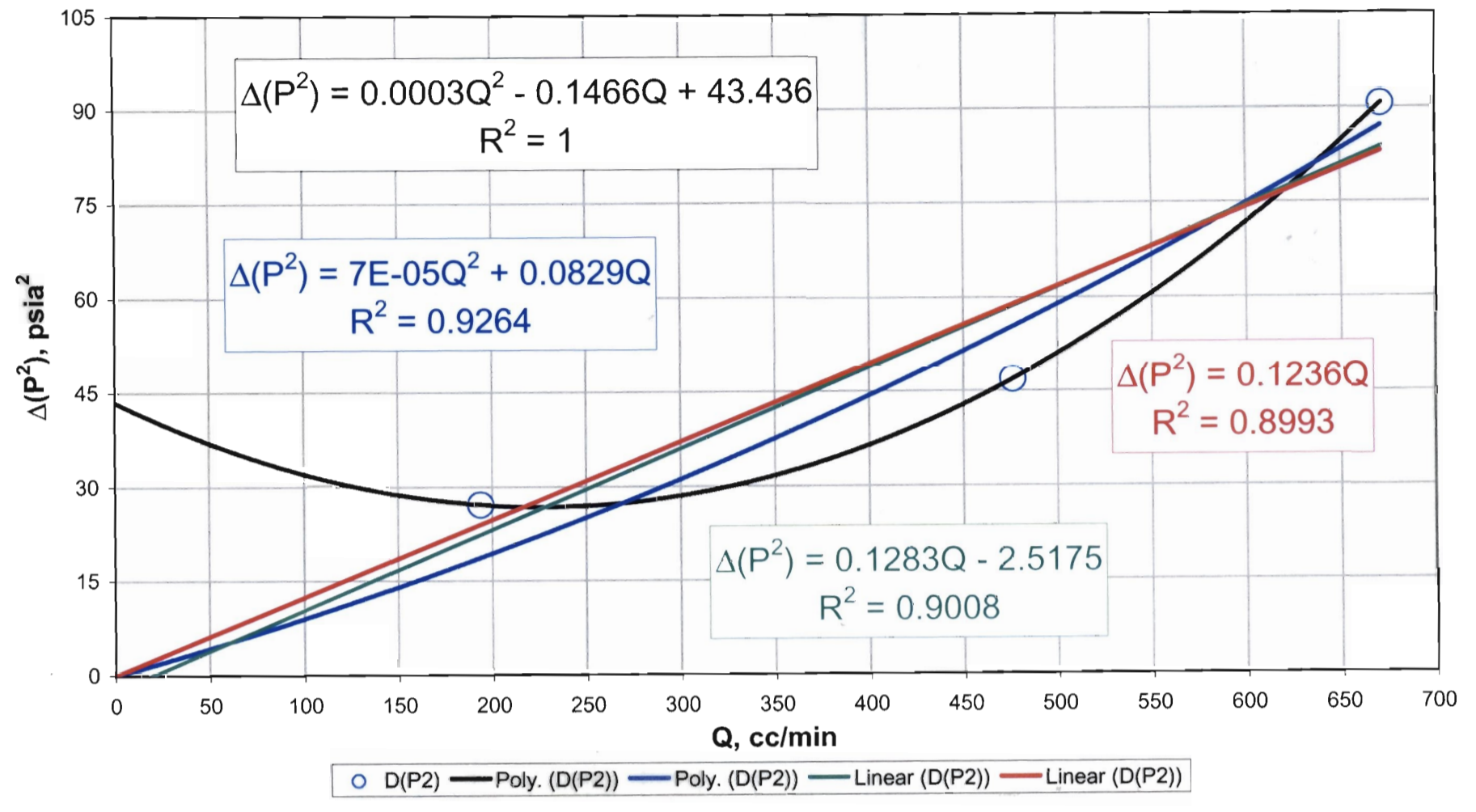
V2 Transect: Drillhole 11



Rmn, 01/28/03

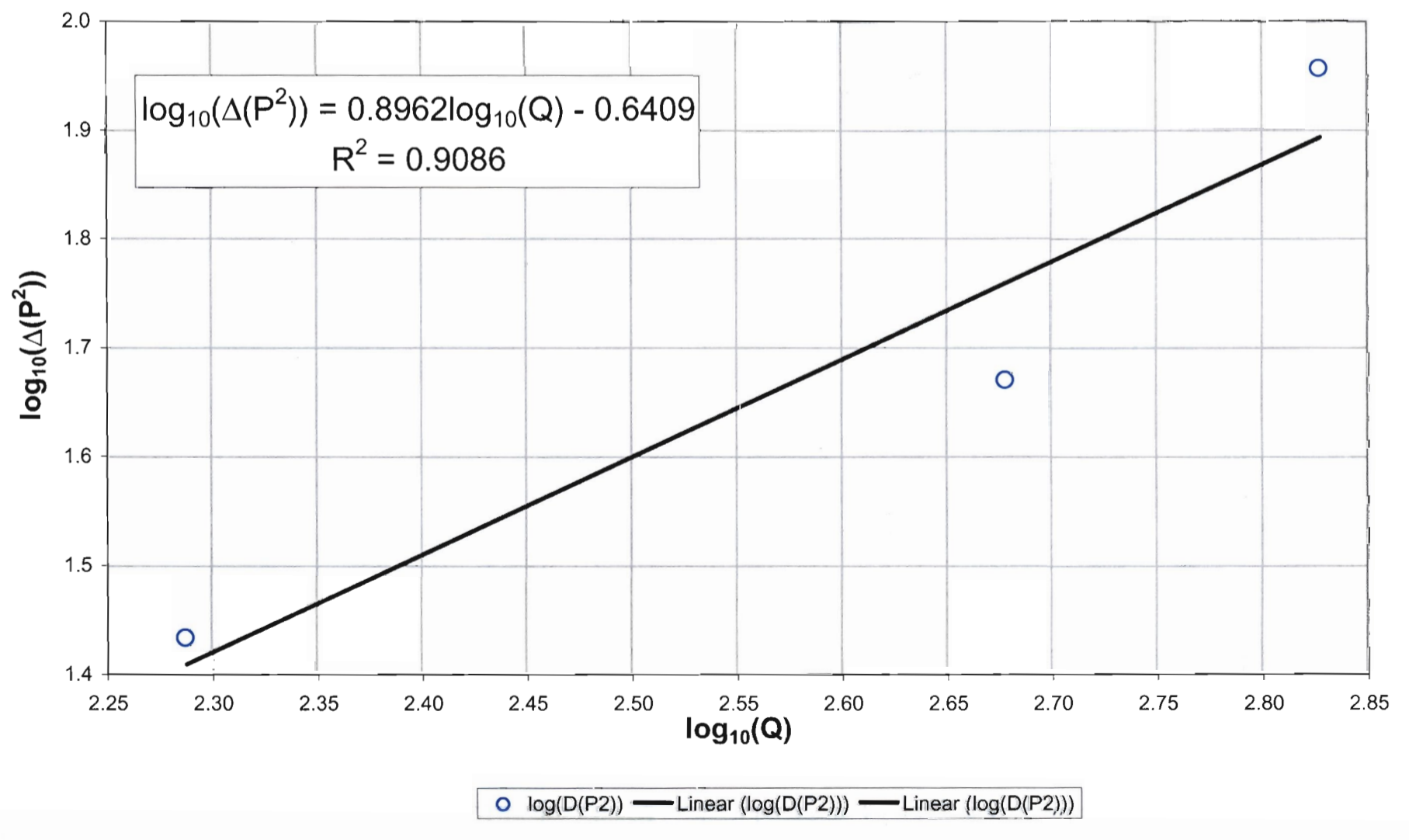
Relationship between steady-state differential pressures squared and flowrate:
 If relationship is linear, with the ordinate intercept nearly zero,
 there is no high velocity flow effect.
 V2 Transect: Drillhole 12

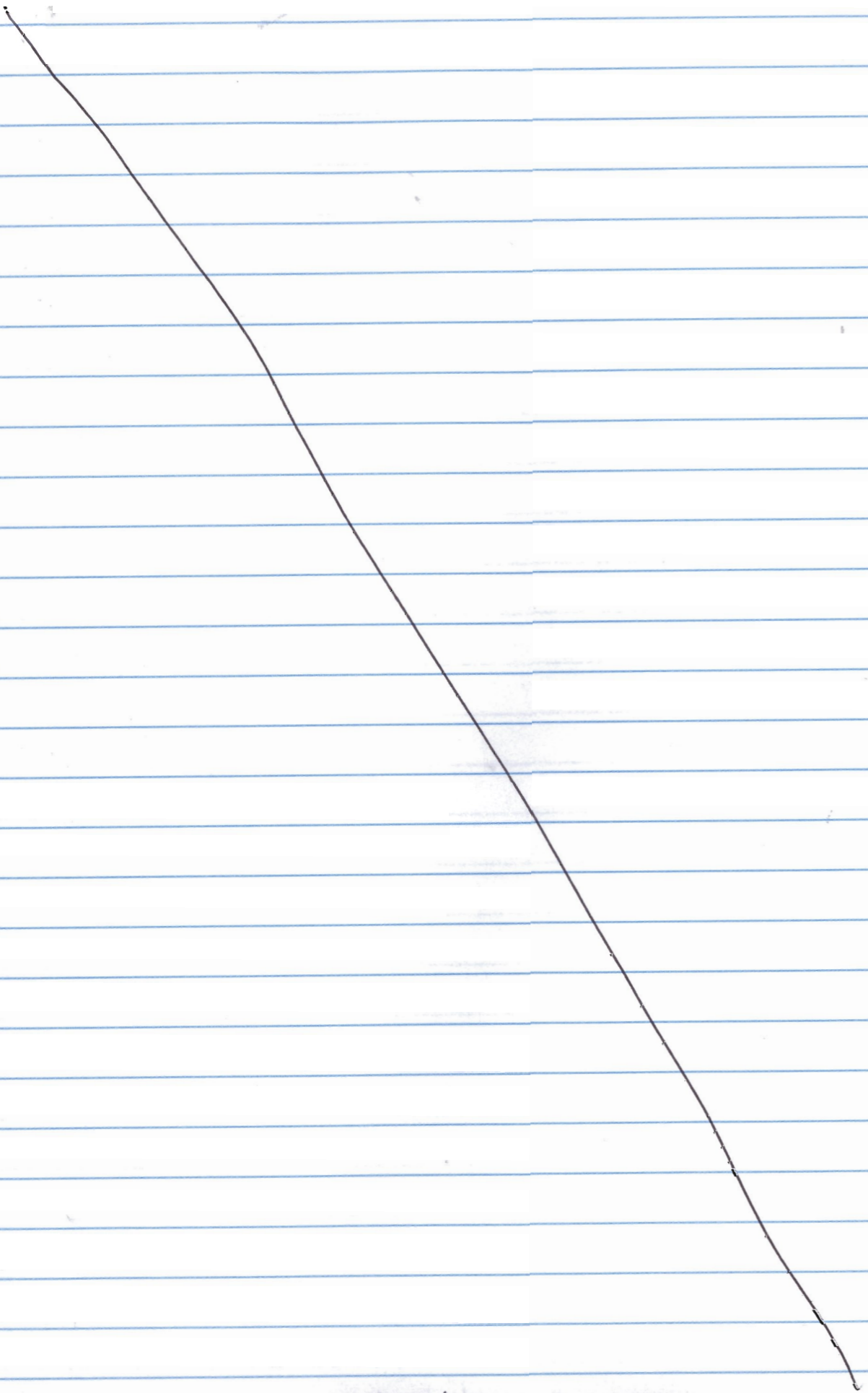
Ann, 01/28/03



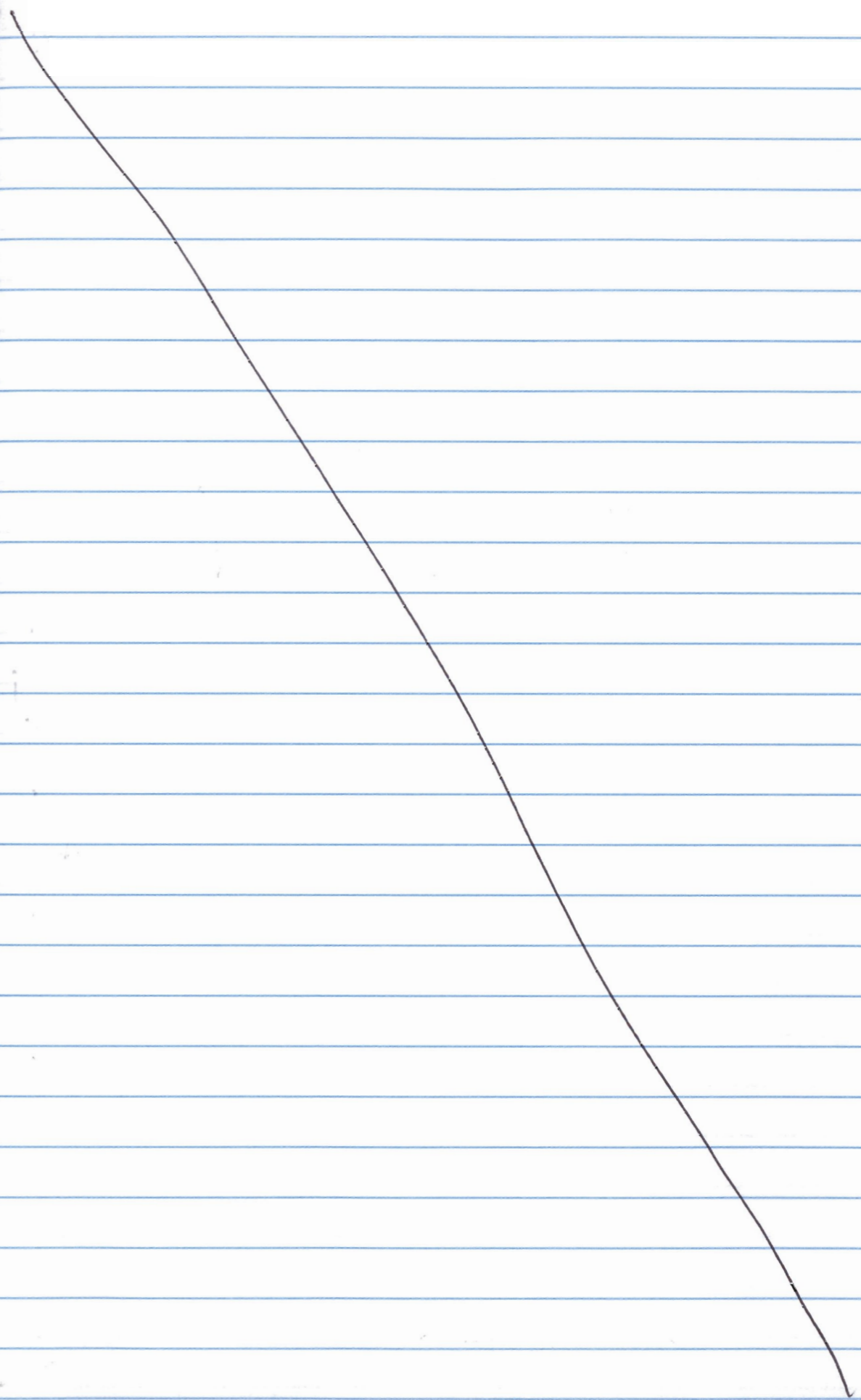
Log-Log plot of differential pressures squared vs. flowrate--used to identify the presence of
 high-velocity flow effects (when the slope is greater than unity)
 V2 Transect: Drillhole 12

Ann, 01/28/03



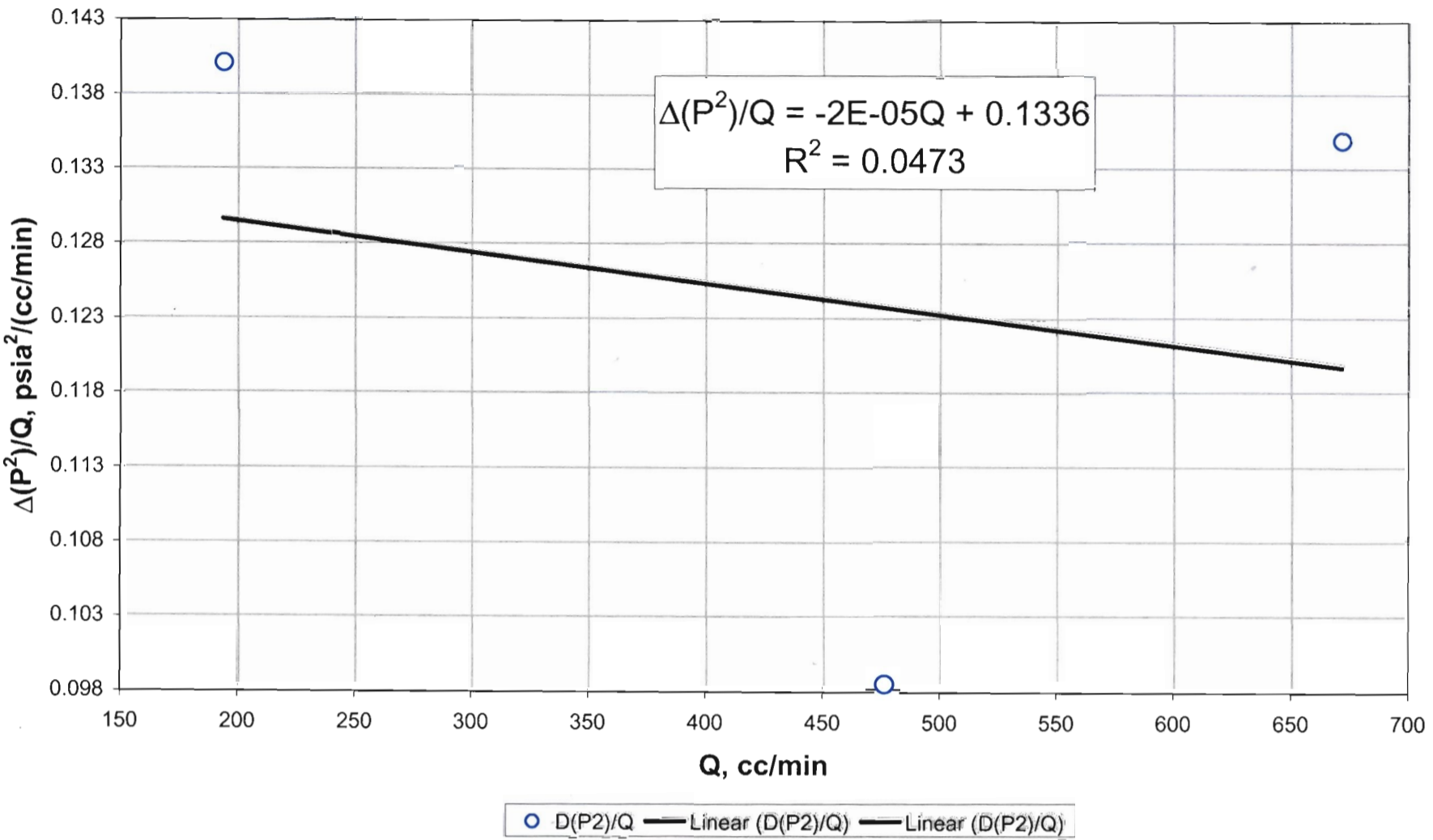


Rum, 01/28/03



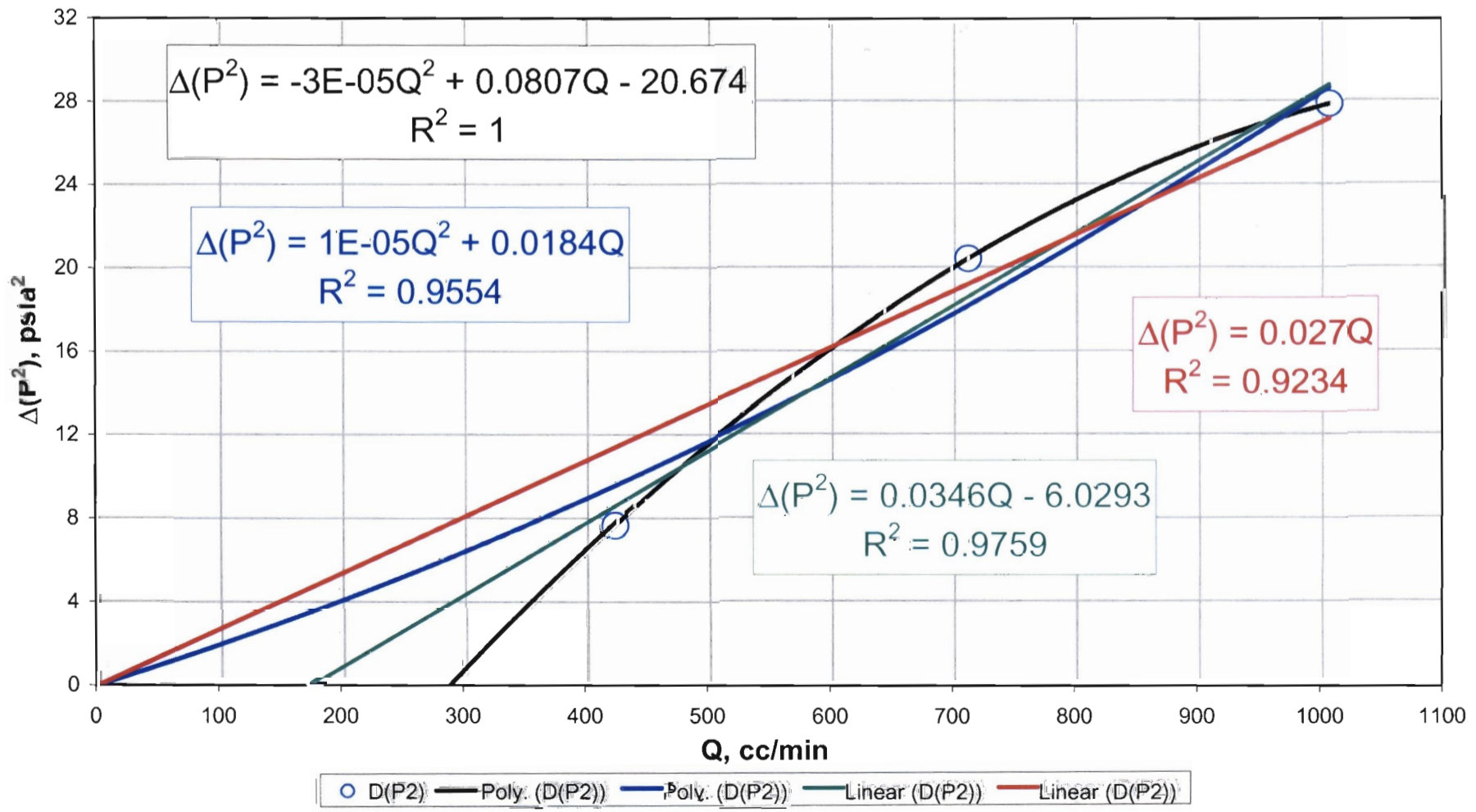
Rum, 01/28/03

Final check for high velocity flow effects:
 High velocity flow effects are present when the slope is non-zero and positive.
 V2 Transect: Drillhole 12



Run, on 10/8/10

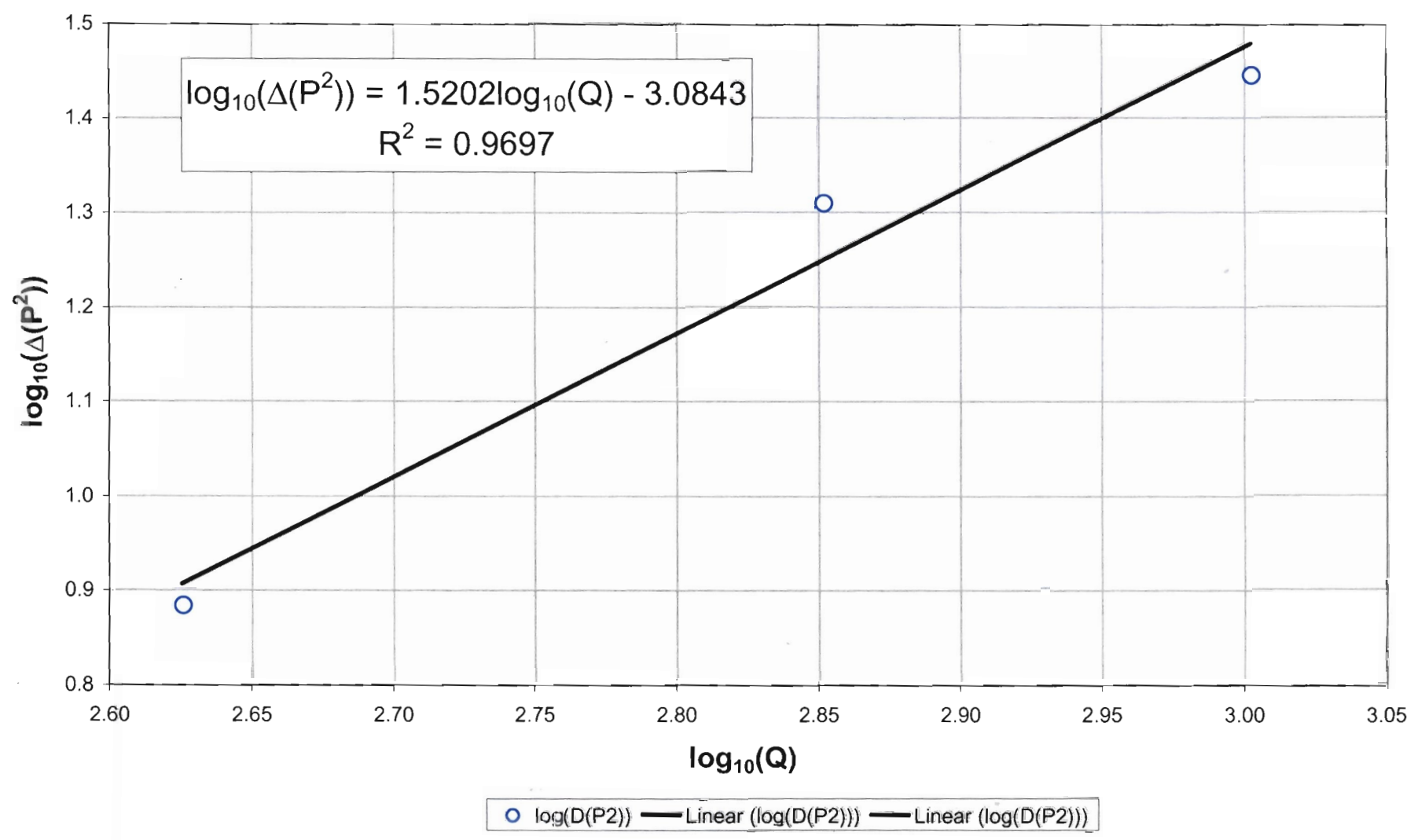
Relationship between steady-state differential pressures squared and flowrate:
 If relationship is linear, with the ordinate intercept nearly zero,
 there is no high velocity flow effect.
 V2 Transect: Drillhole 13



Run, on 10/8/10

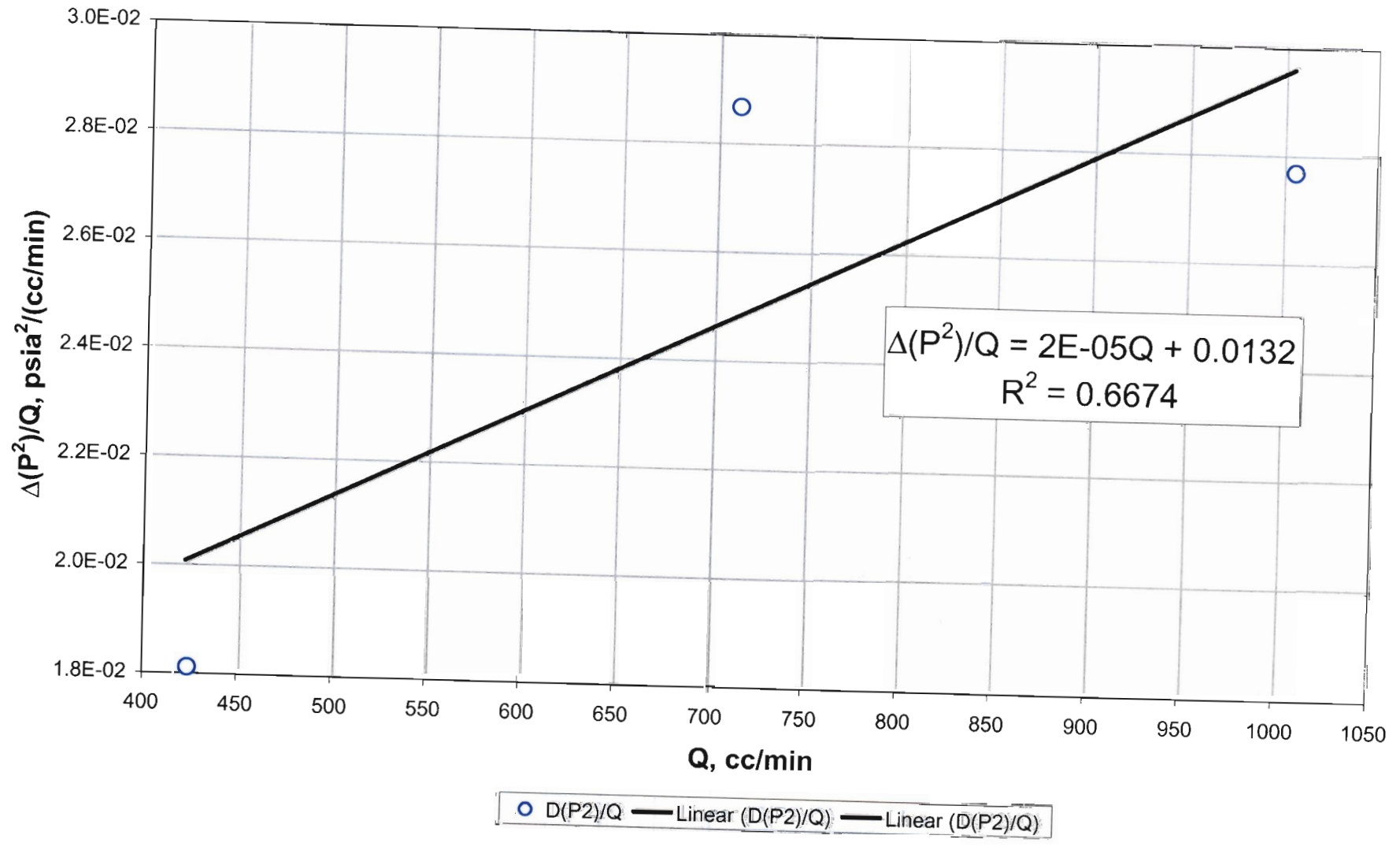
Log-Log plot of differential pressures squared vs. flowrate--used to identify the presence of high-velocity flow effects (when the slope is greater than unity)
V2 Transect: Drillhole 13

Rmn, 01/18/03

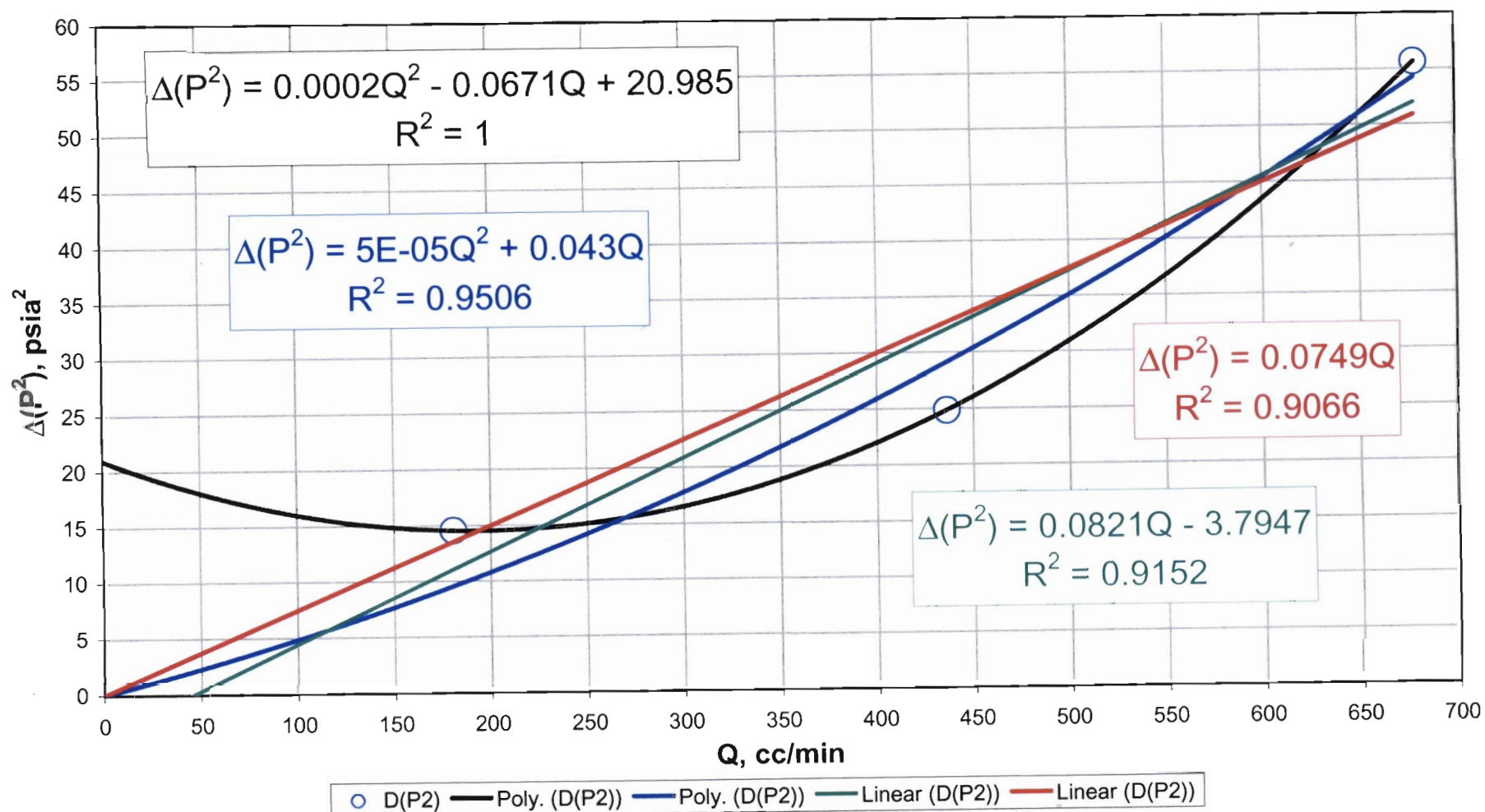


Final check for high velocity flow effects:
High velocity flow effects are present when the slope is non-zero and positive.
V2 Transect: Drillhole 13

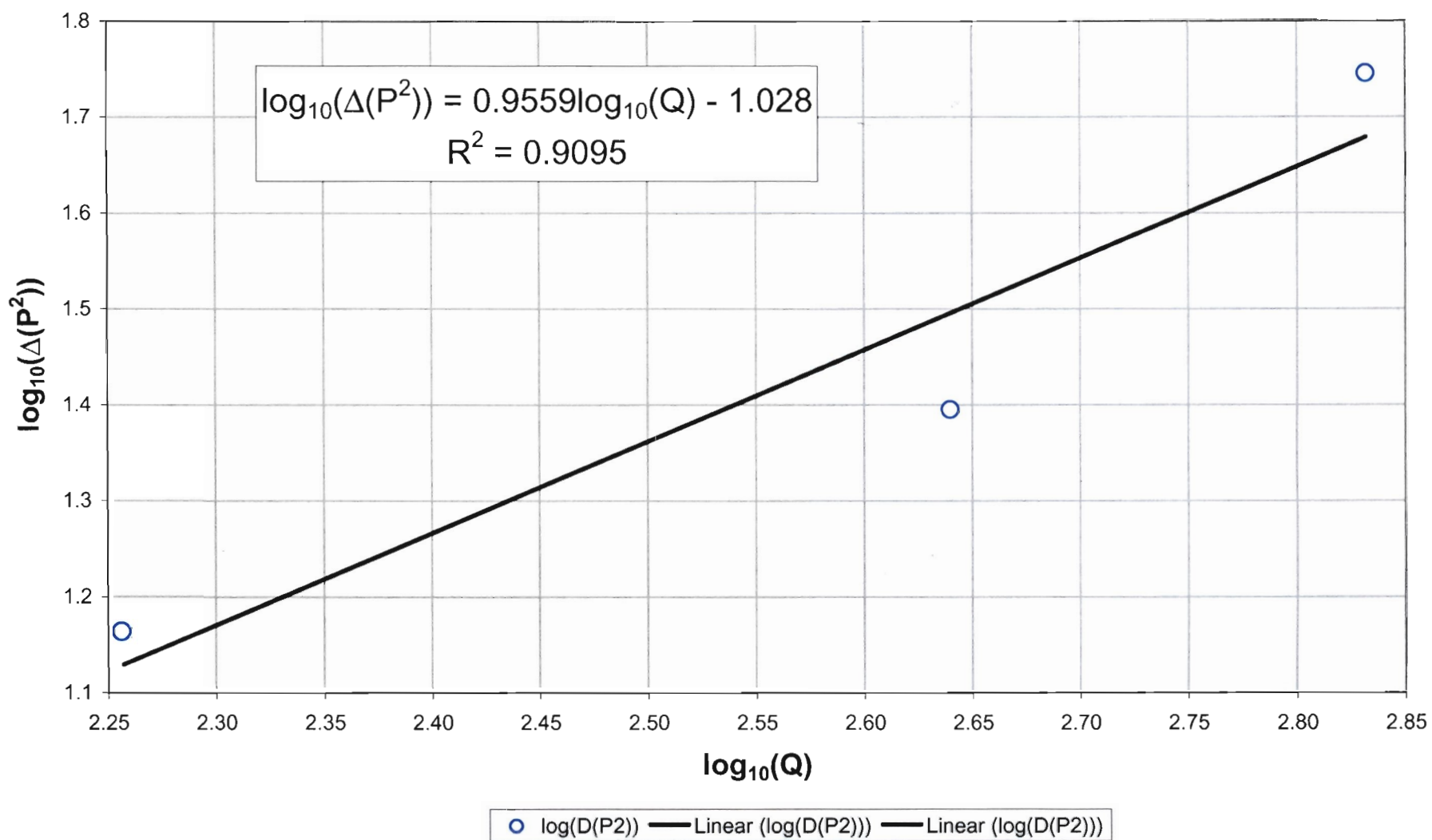
Rmn, 01/18/03



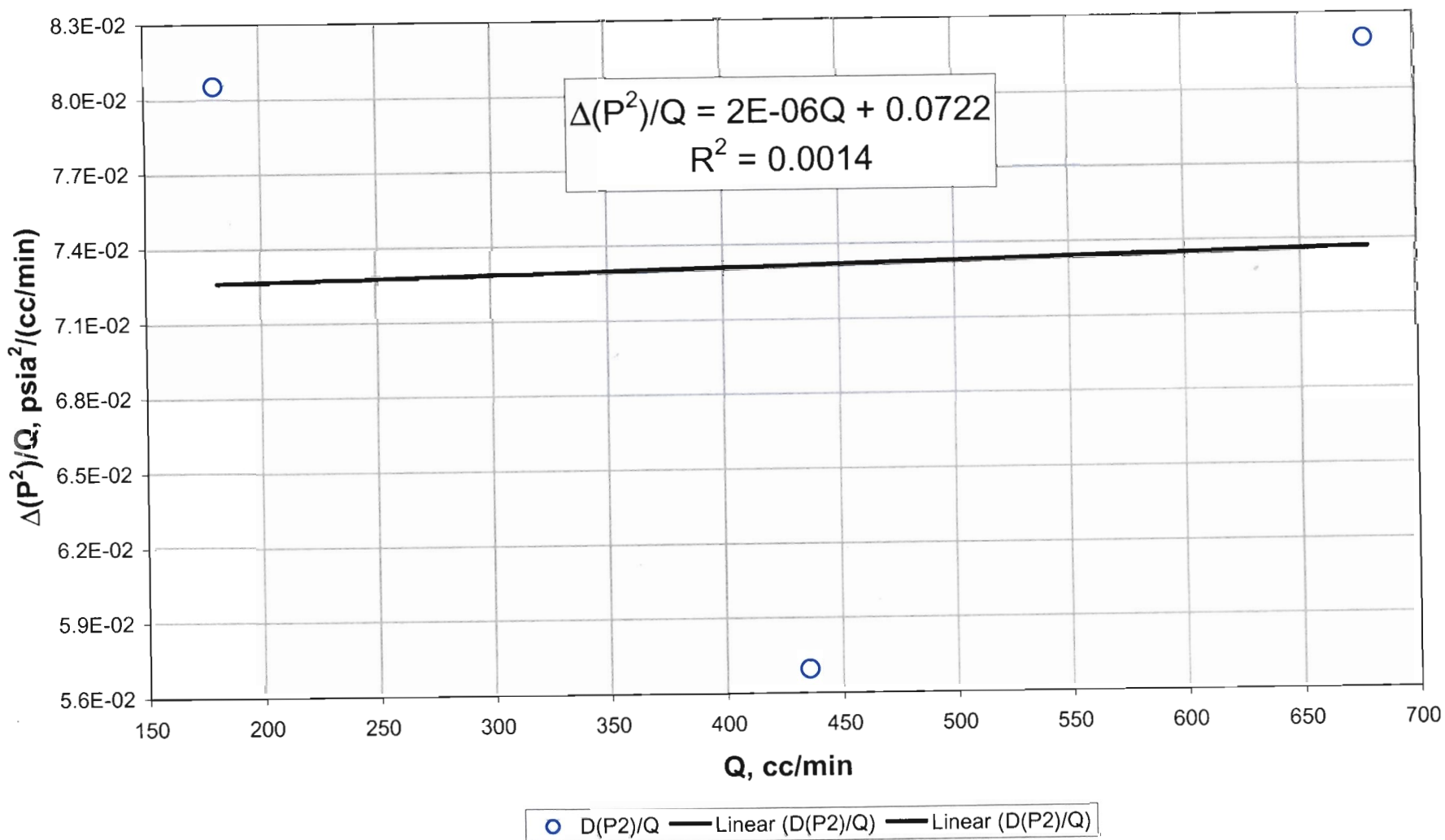
Relationship between steady-state differential pressures squared and flowrate:
 If relationship is linear, with the ordinate intercept nearly zero,
 there is no high velocity flow effect.
 V2 Transect: Drillhole 14



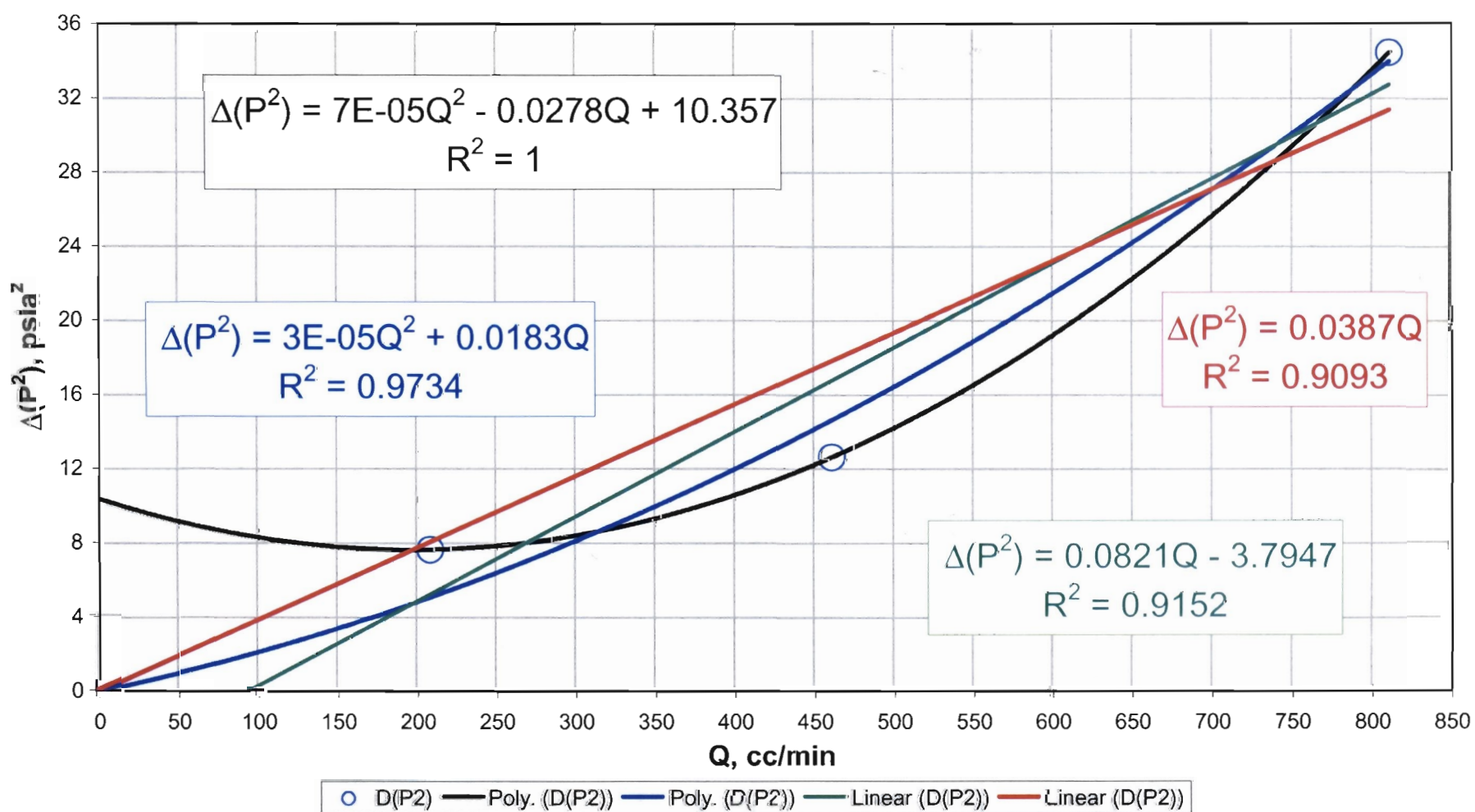
Log-Log plot of differential pressures squared vs. flowrate--used to identify the presence of
 high-velocity flow effects (when the slope is greater than unity)
 V2 Transect: Drillhole 14



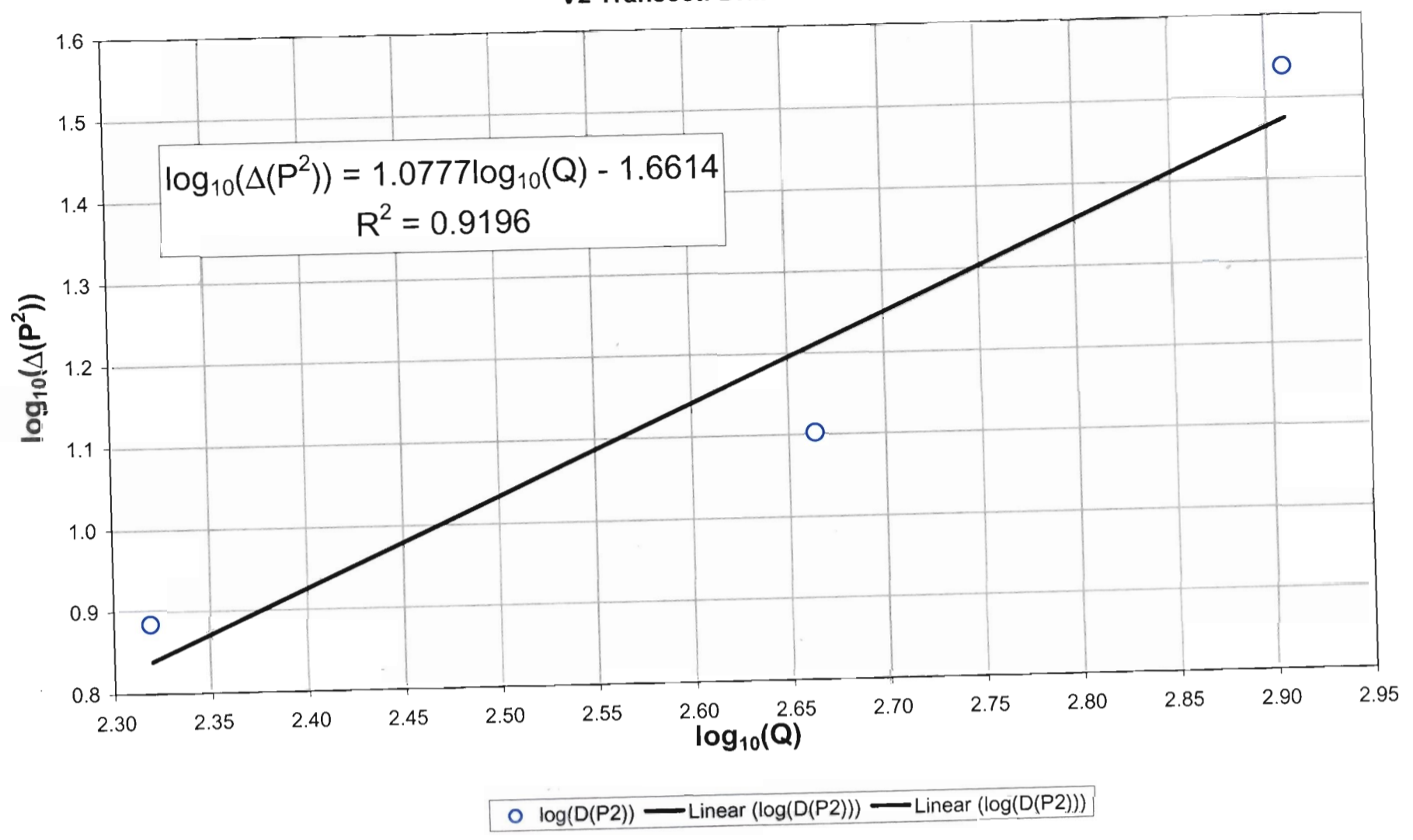
Final check for high velocity flow effects:
 High velocity flow effects are present when the slope is non-zero and positive.
 V2 Transect: Drillhole 14



Relationship between steady-state differential pressures squared and flowrate:
 If relationship is linear, with the ordinate intercept nearly zero,
 there is no high velocity flow effect.
 V2 Transect: Drillhole 15

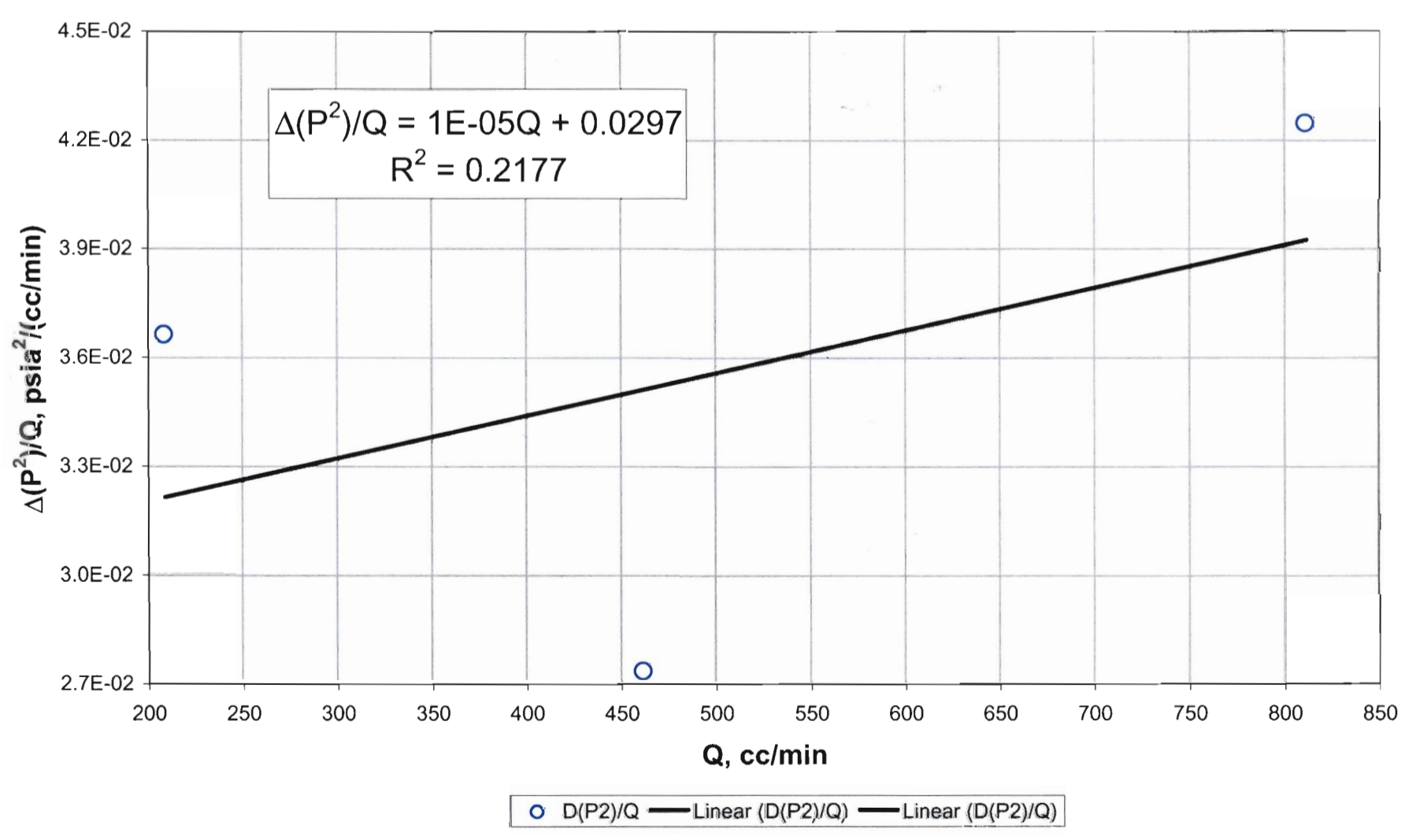


Log-Log plot of differential pressures squared vs. flowrate--used to identify the presence of high-velocity flow effects (when the slope is greater than unity)
 V2 Transect: Drillhole 15



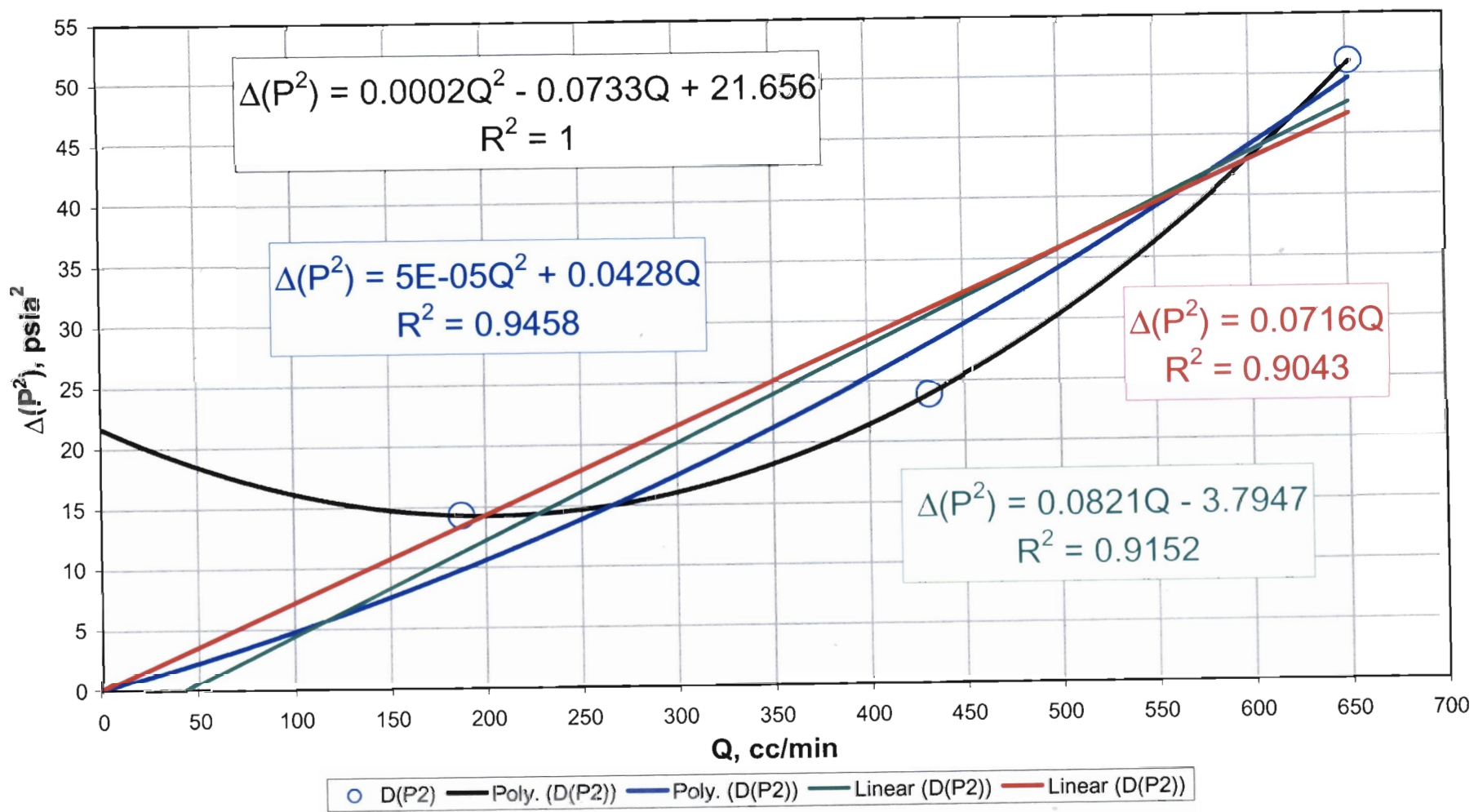
RNM, 01/28/03

Final check for high velocity flow effects:
 High velocity flow effects are present when the slope is non-zero and positive.
 V2 Transect: Drillhole 15

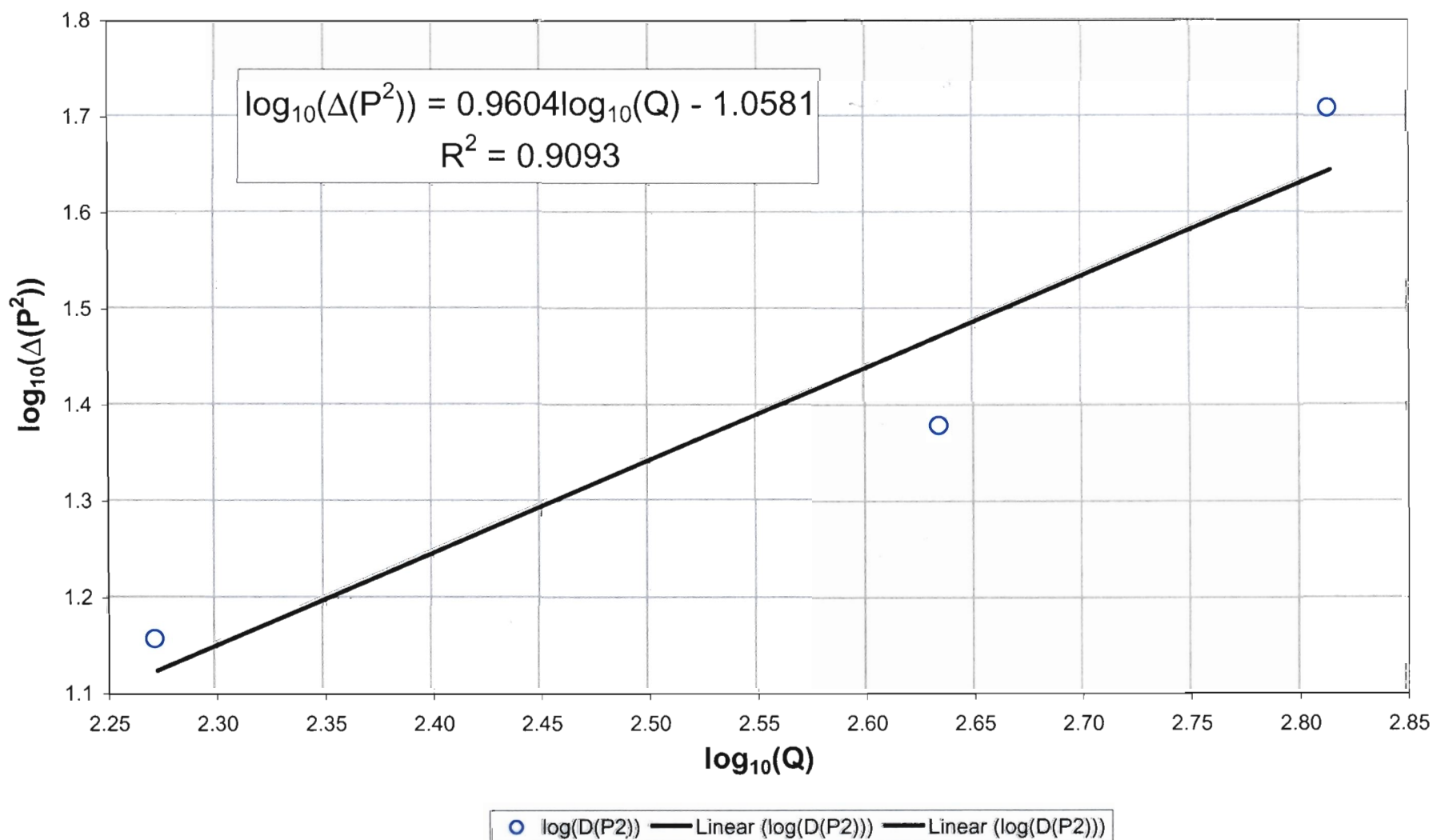


RNM, 01/28/03

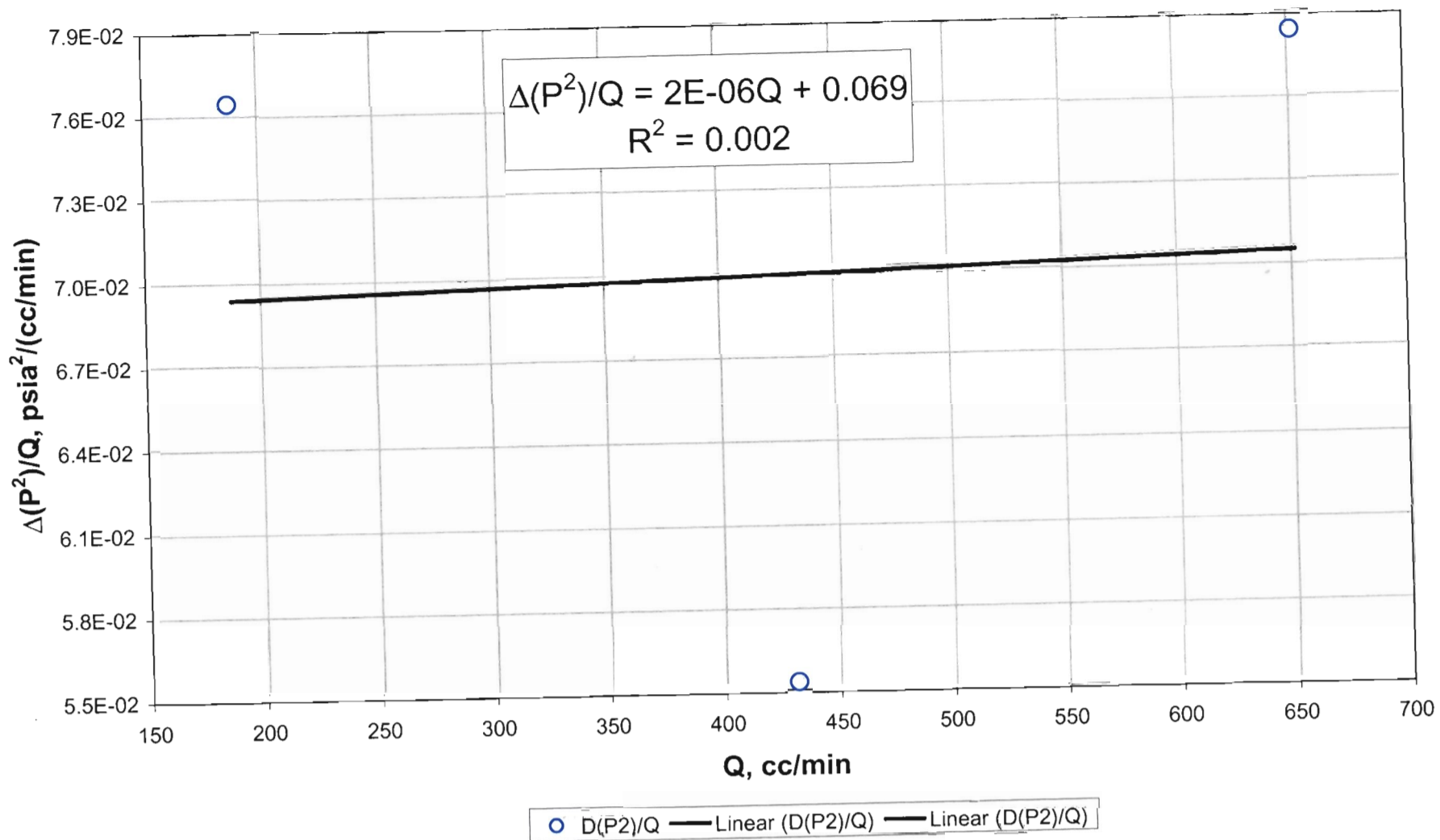
Relationship between steady-state differential pressures squared and flowrate:
 If relationship is linear, with the ordinate intercept nearly zero,
 there is no high velocity flow effect.
 V2 Transect: Drillhole 16



Log-Log plot of differential pressures squared vs. flowrate--used to identify the presence of
 high-velocity flow effects (when the slope is greater than unity)
 V2 Transect: Drillhole 16

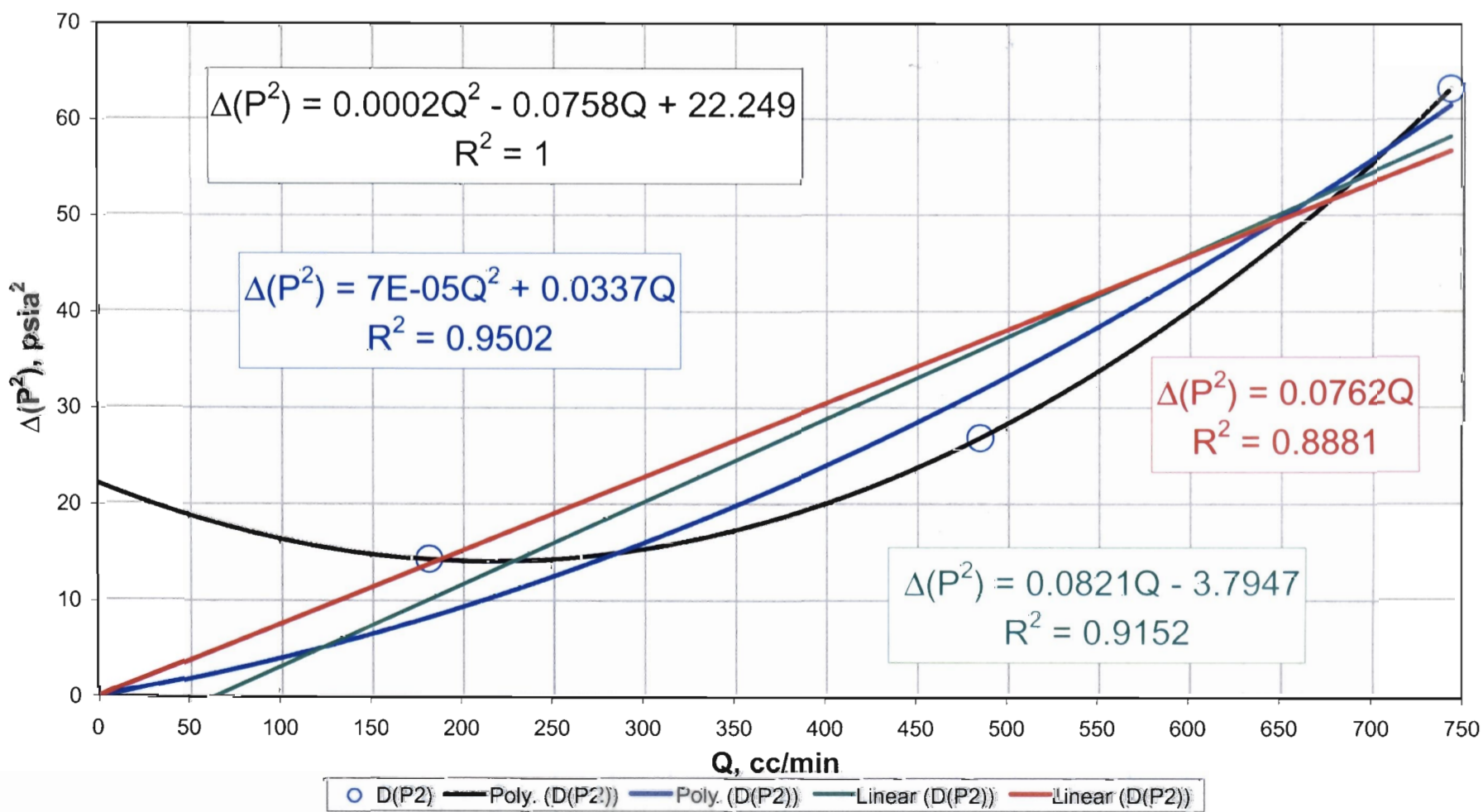


Final check for high velocity flow effects:
 High velocity flow effects are present when the slope is non-zero and positive.
 V2 Transect: Drillhole 16



Rmn, 01/28/03

Relationship between steady-state differential pressures squared and flowrate:
 If relationship is linear, with the ordinate intercept nearly zero,
 there is no high velocity flow effect.
 V2 Transect: Drillhole 17

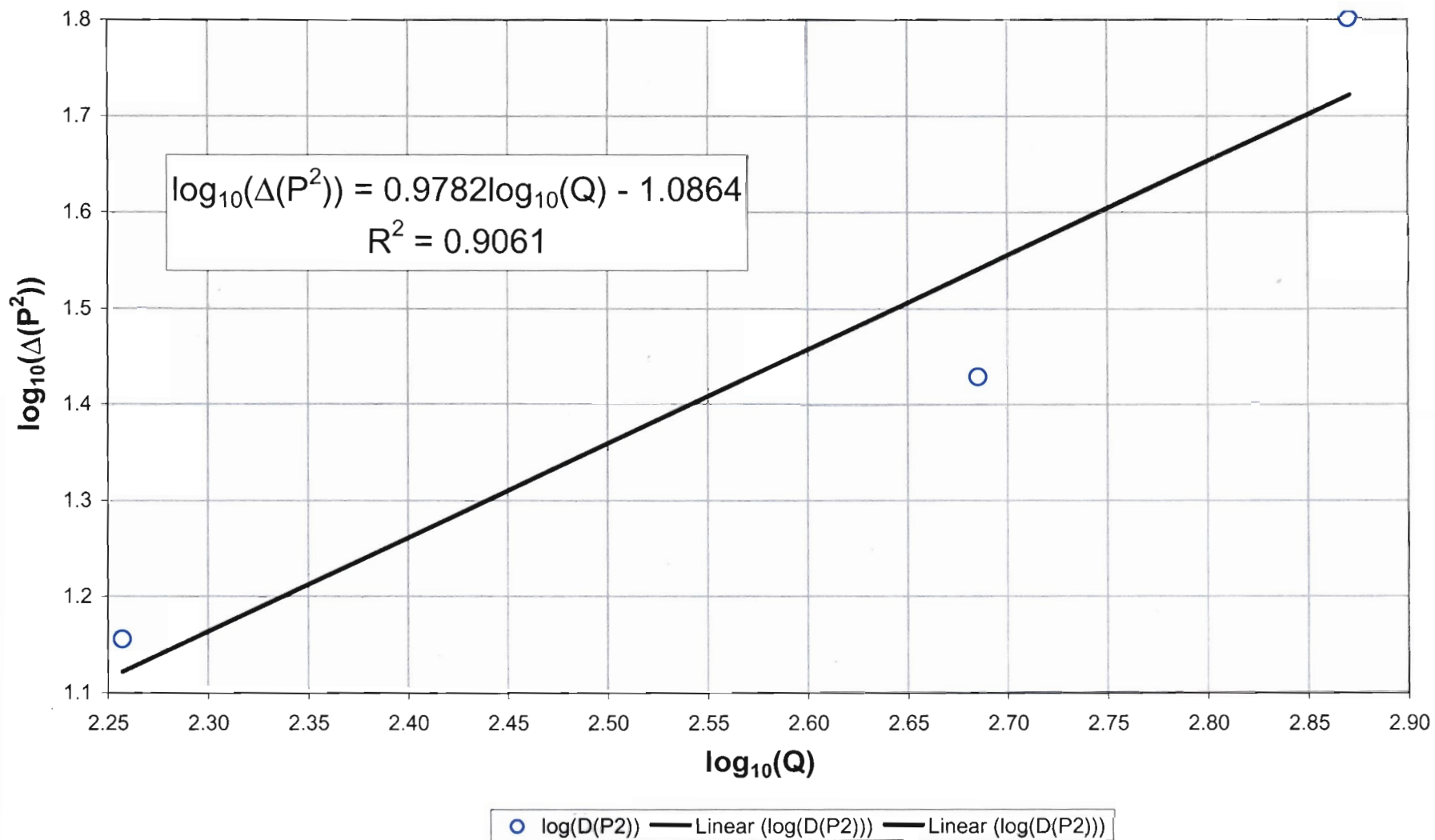


Rmn, 01/28/03

Log-Log plot of differential pressures squared vs. flowrate--used to identify the presence of high-velocity flow effects (when the slope is greater than unity)

V2 Transect: Drillhole 17

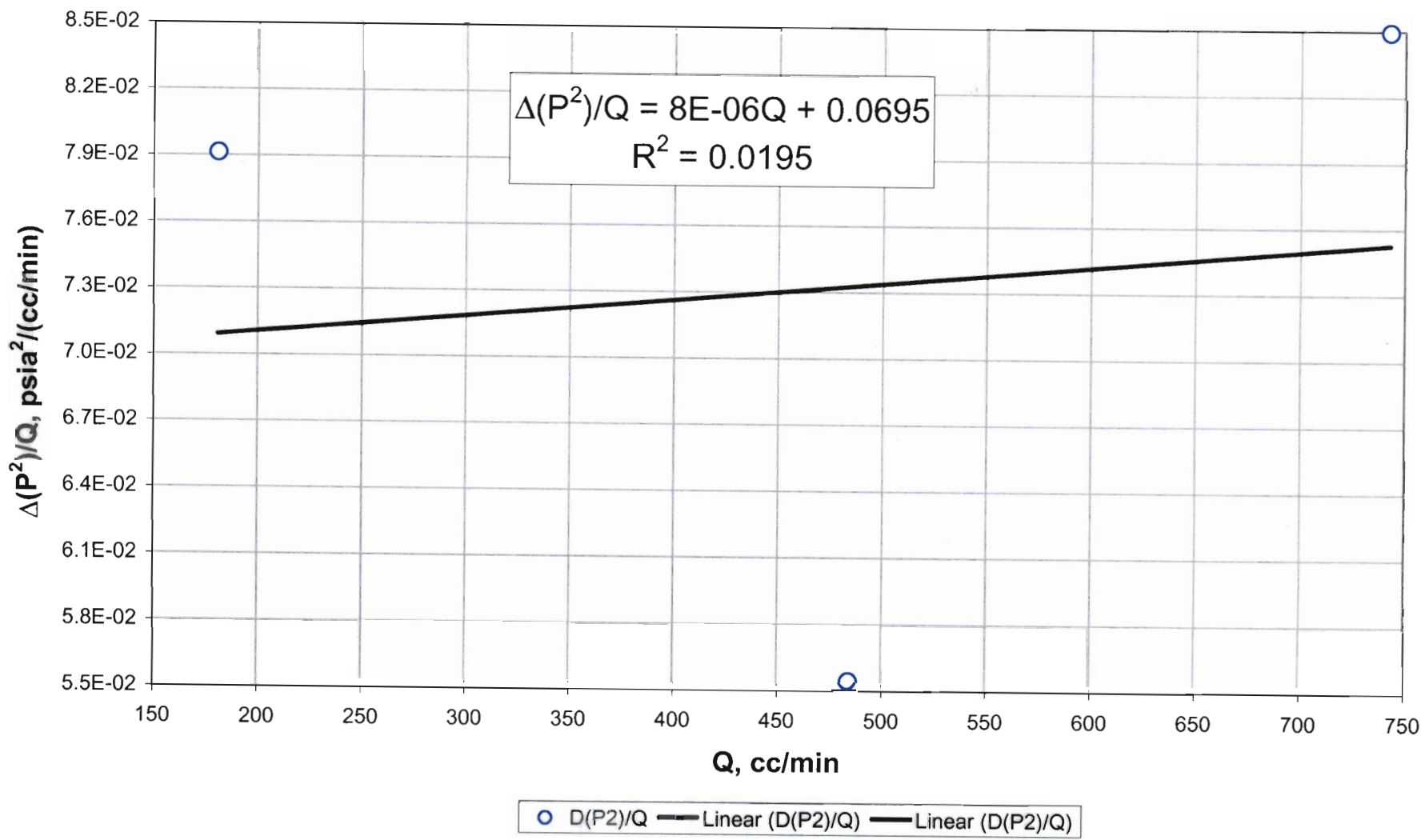
RMN, 01/28/05



○ log(D(P2)) — Linear (log(D(P2))) — Linear (log(D(P2)))

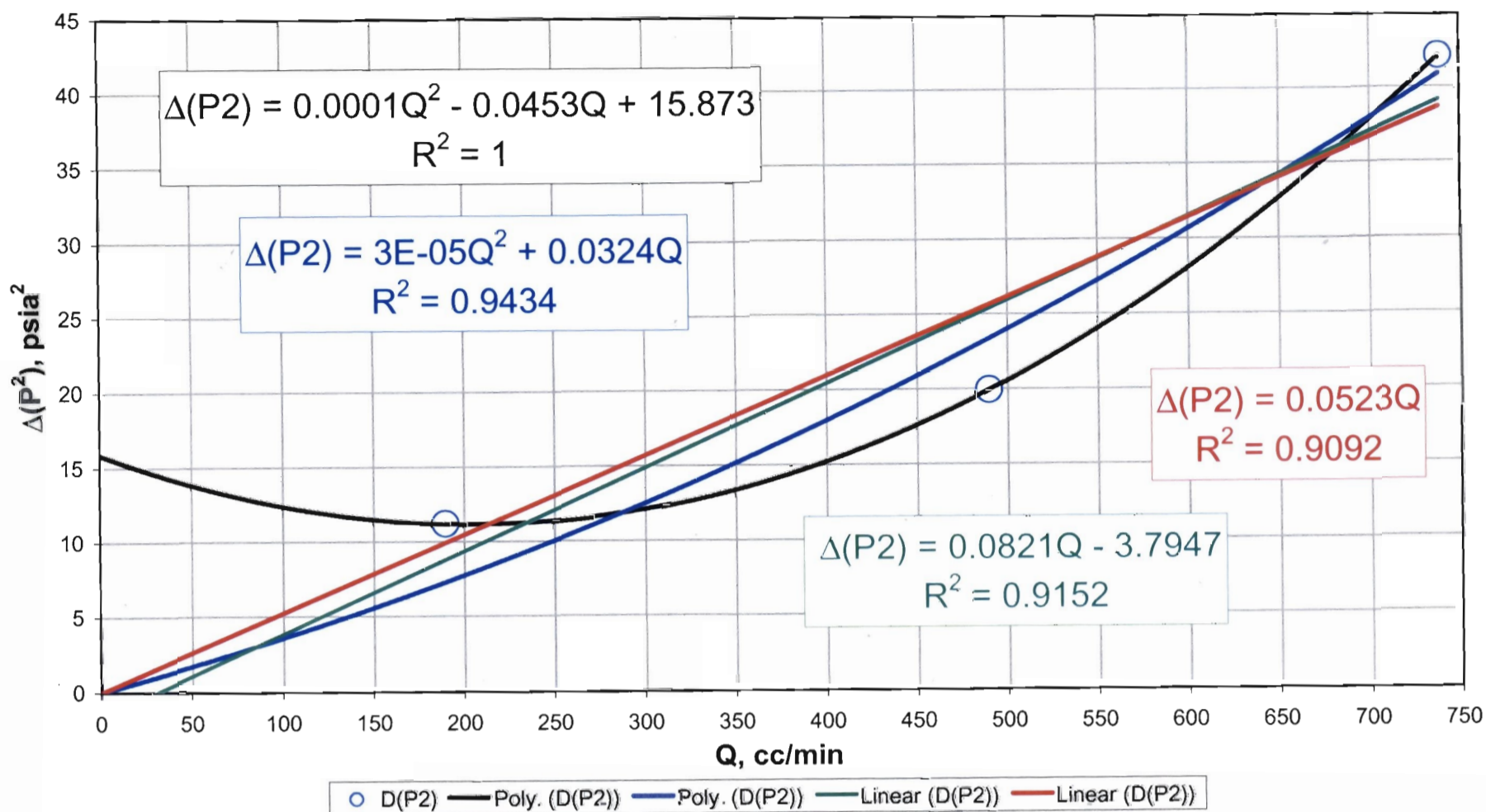
Final check for high velocity flow effects: High velocity flow effects are present when the slope is non-zero and positive. V2 Transect: Drillhole 17

RMN, 01/28/05

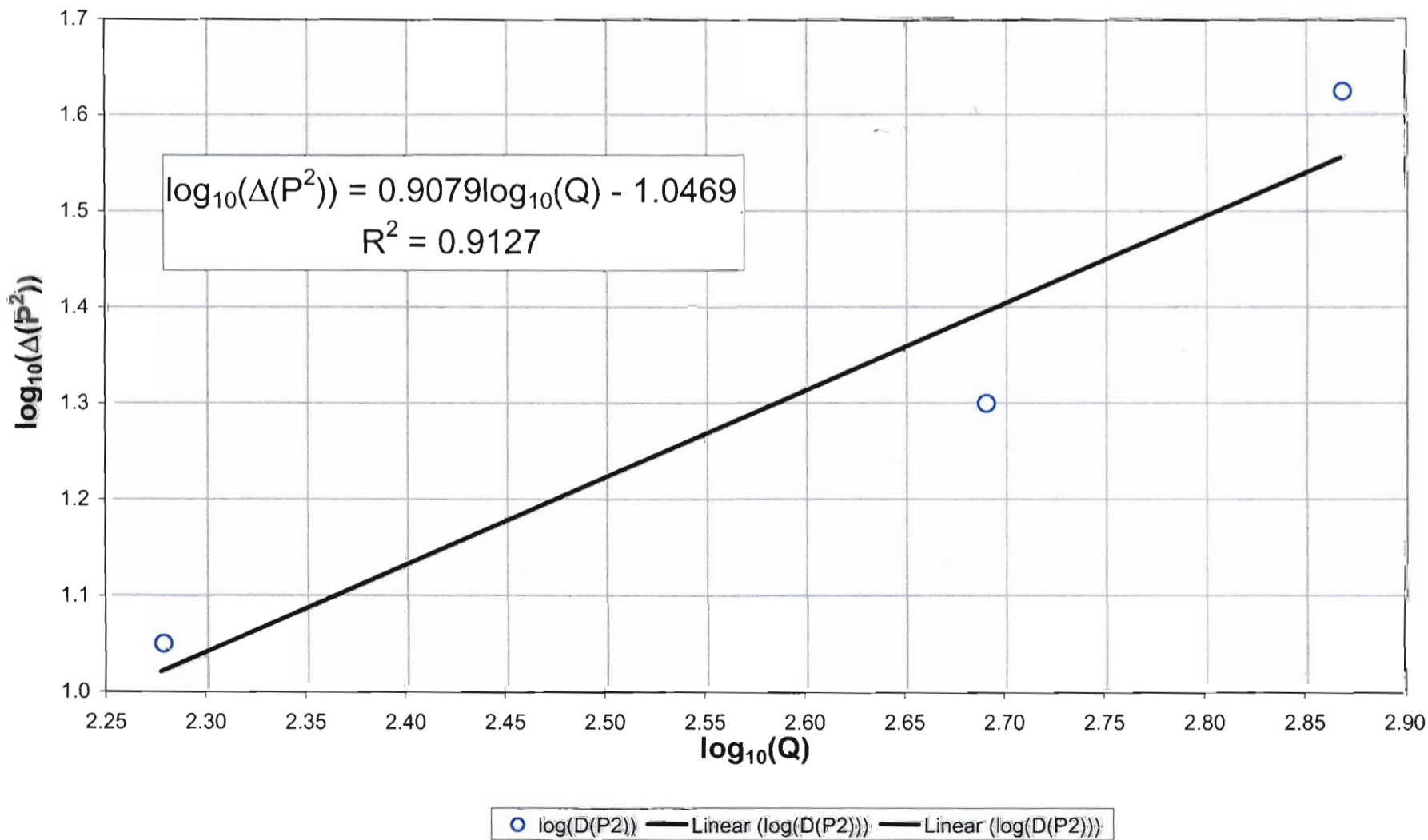


○ D(P2)/Q — Linear (D(P2)/Q) — Linear (D(P2)/Q)

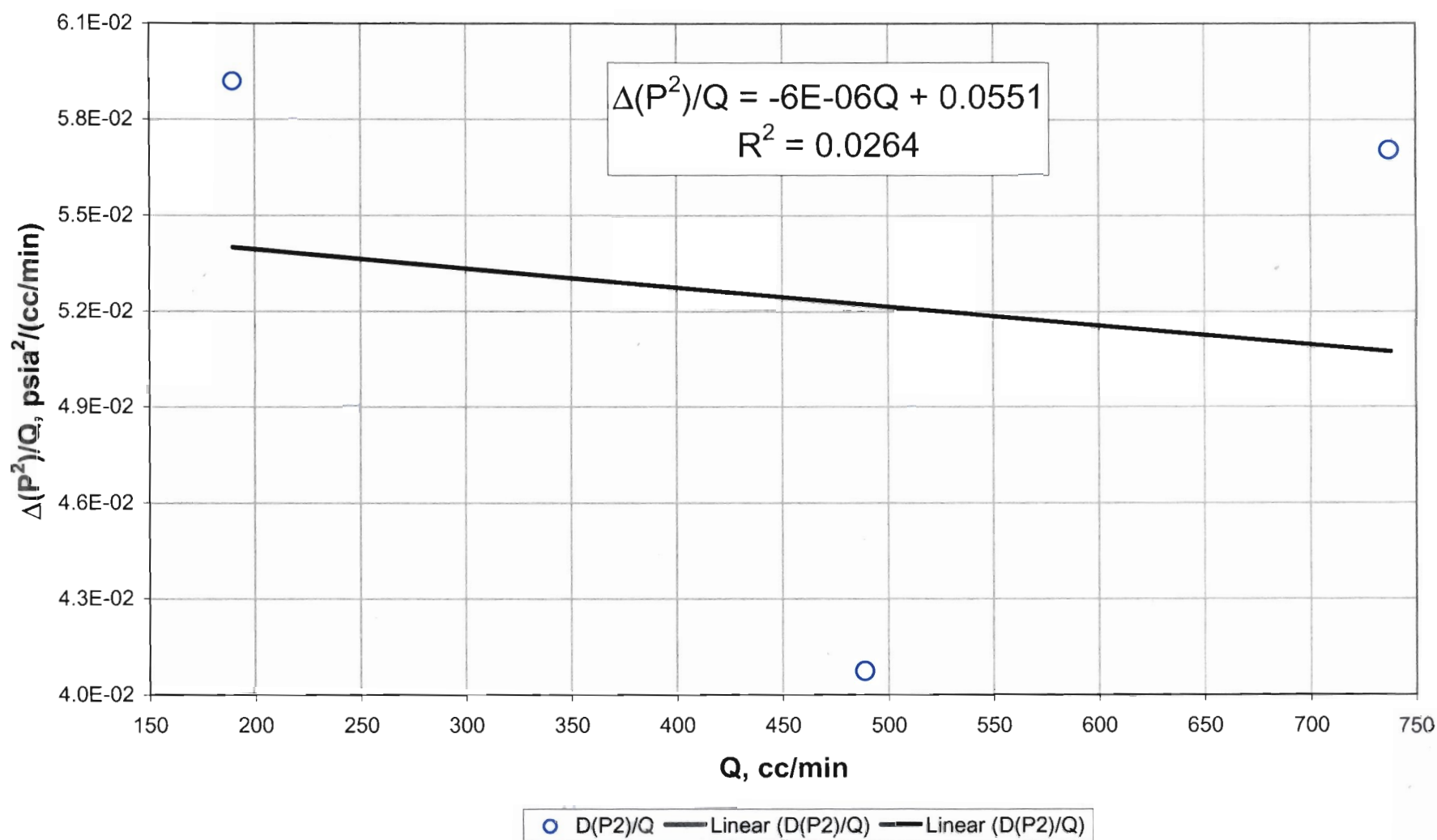
Relationship between steady-state differential pressures squared and flowrate:
 If relationship is linear, with the ordinate intercept nearly zero,
 there is no high velocity flow effect.
 V2 Transect: Drillhole 18



Log-Log plot of differential pressures squared vs. flowrate--used to identify the presence of
 high-velocity flow effects (when the slope is greater than unity)
 V2 Transect: Drillhole 18

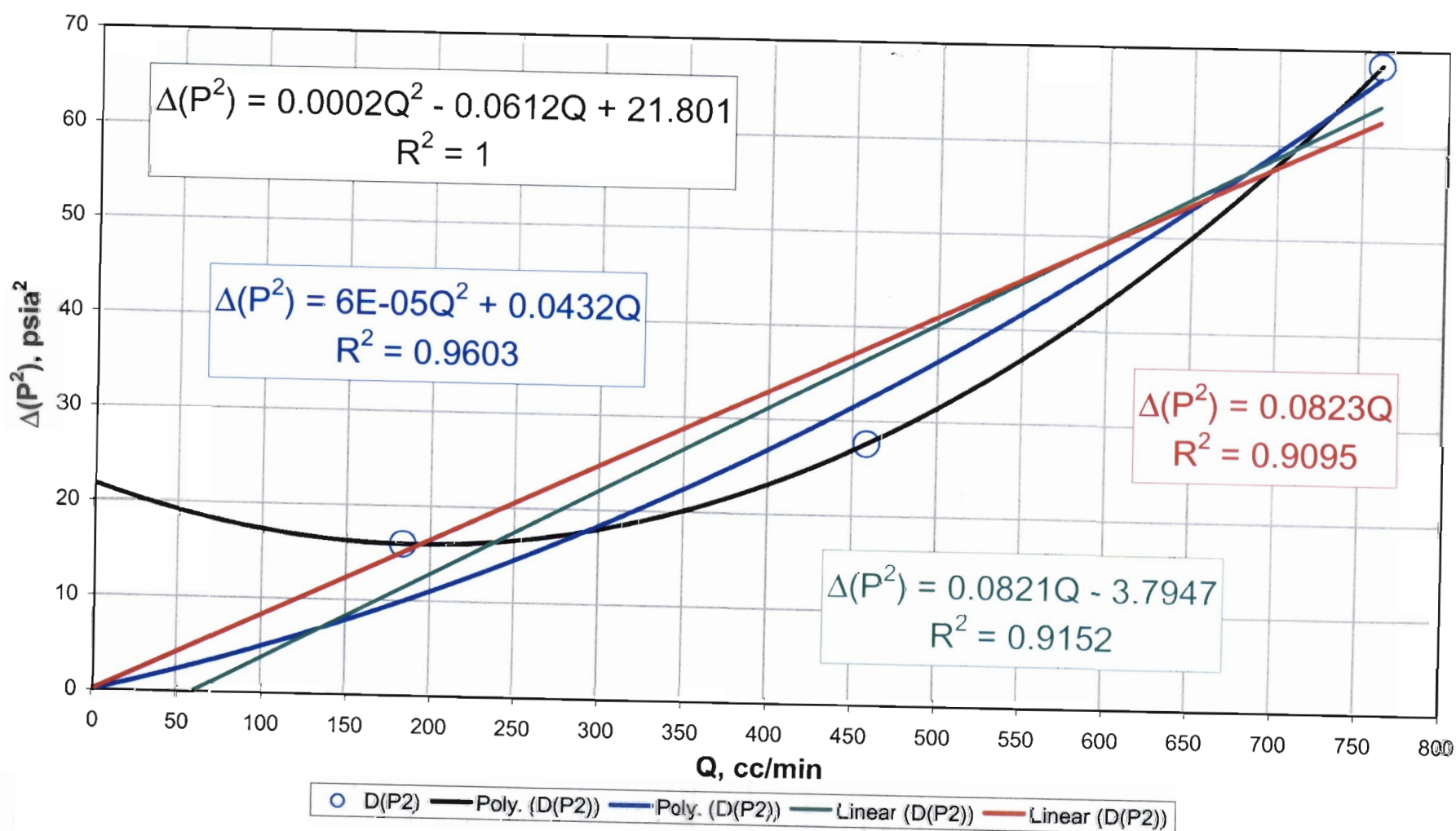


Final check for high velocity flow effects:
 High velocity flow effects are present when the slope is non-zero and positive.
 V2 Transect: Drillhole 18



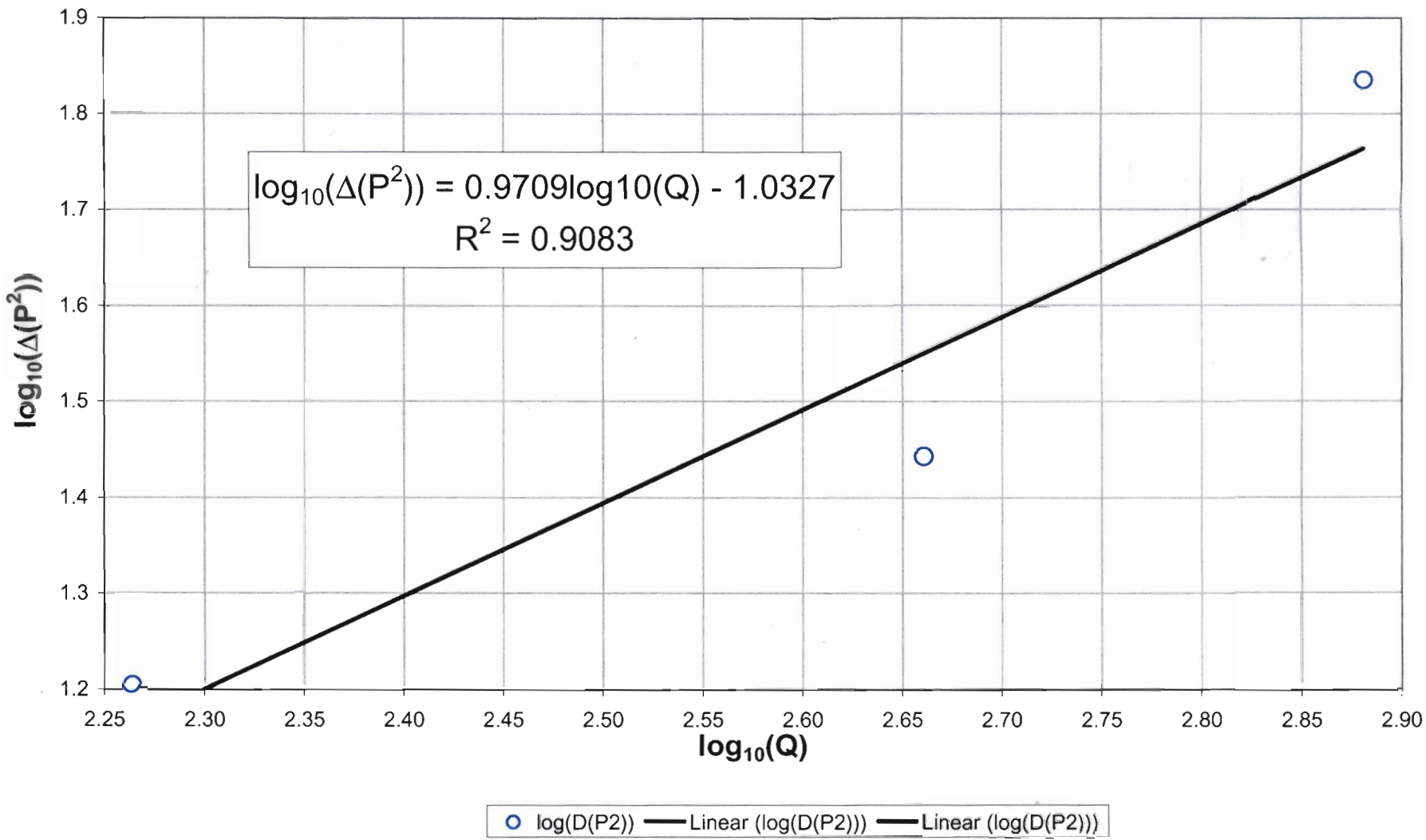
RNM, 01/28/03

Relationship between steady-state differential pressures squared and flowrate:
 If relationship is linear, with the ordinate intercept nearly zero,
 there is no high velocity flow effect.
 V2 Transect: Drillhole 19



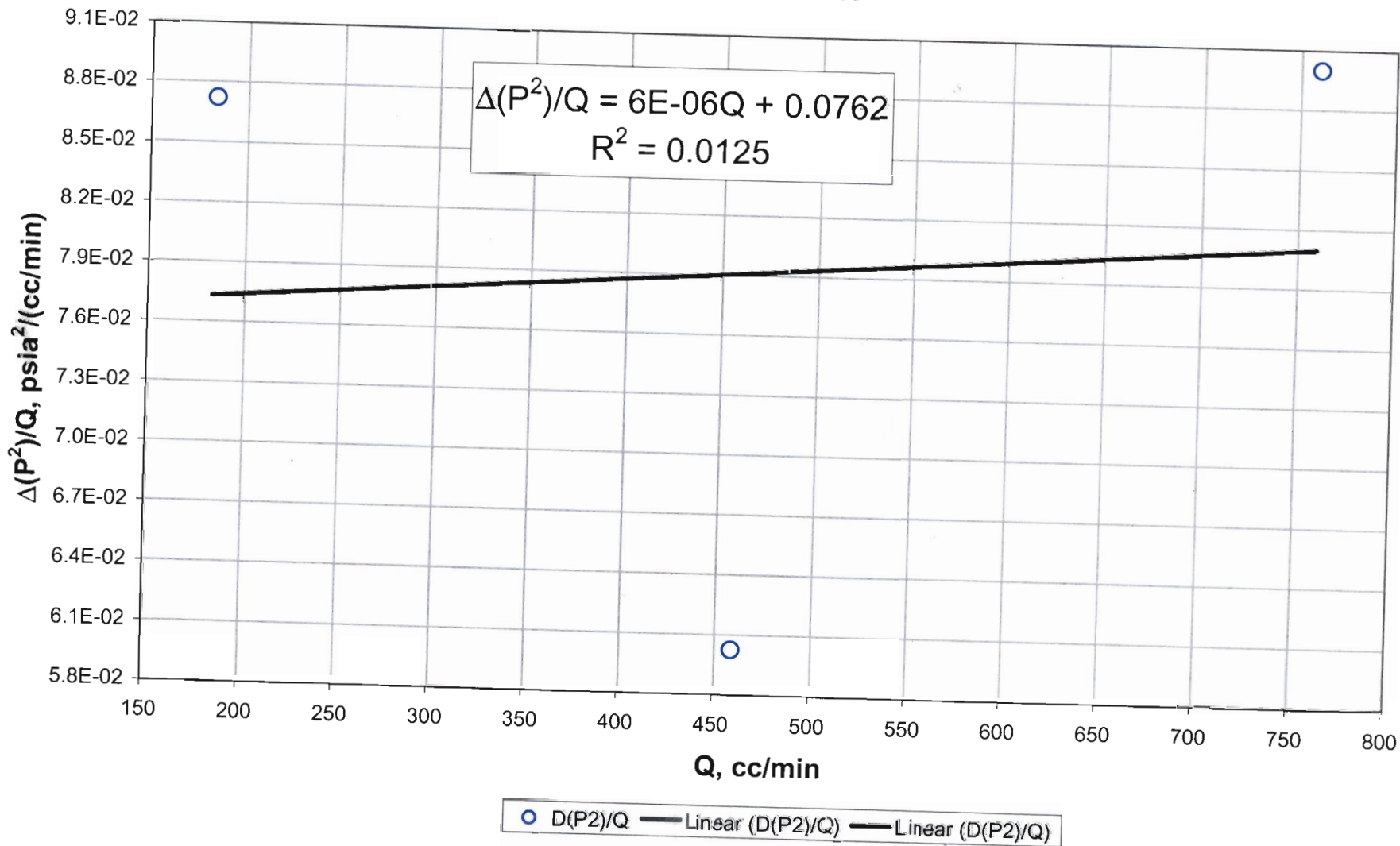
RNM, 01/28/03

Log-Log plot of differential pressures squared vs. flowrate--used to identify the presence of high-velocity flow effects (when the slope is greater than unity)
V2 Transect: Drillhole 19



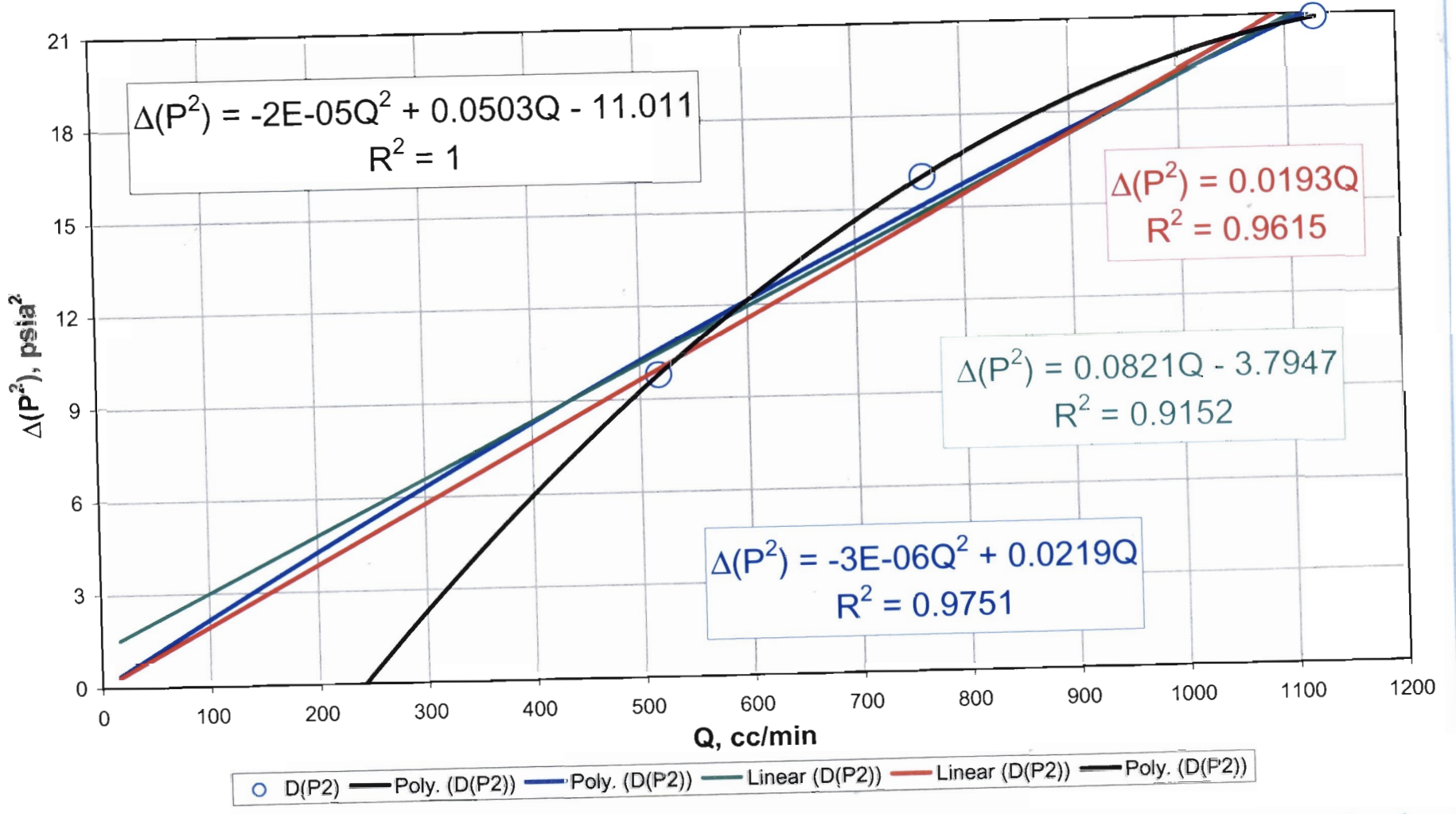
RNM, 01/28/03

Final check for high velocity flow effects:
High velocity flow effects are present when the slope is non-zero and positive.
V2 Transect: Drillhole 19



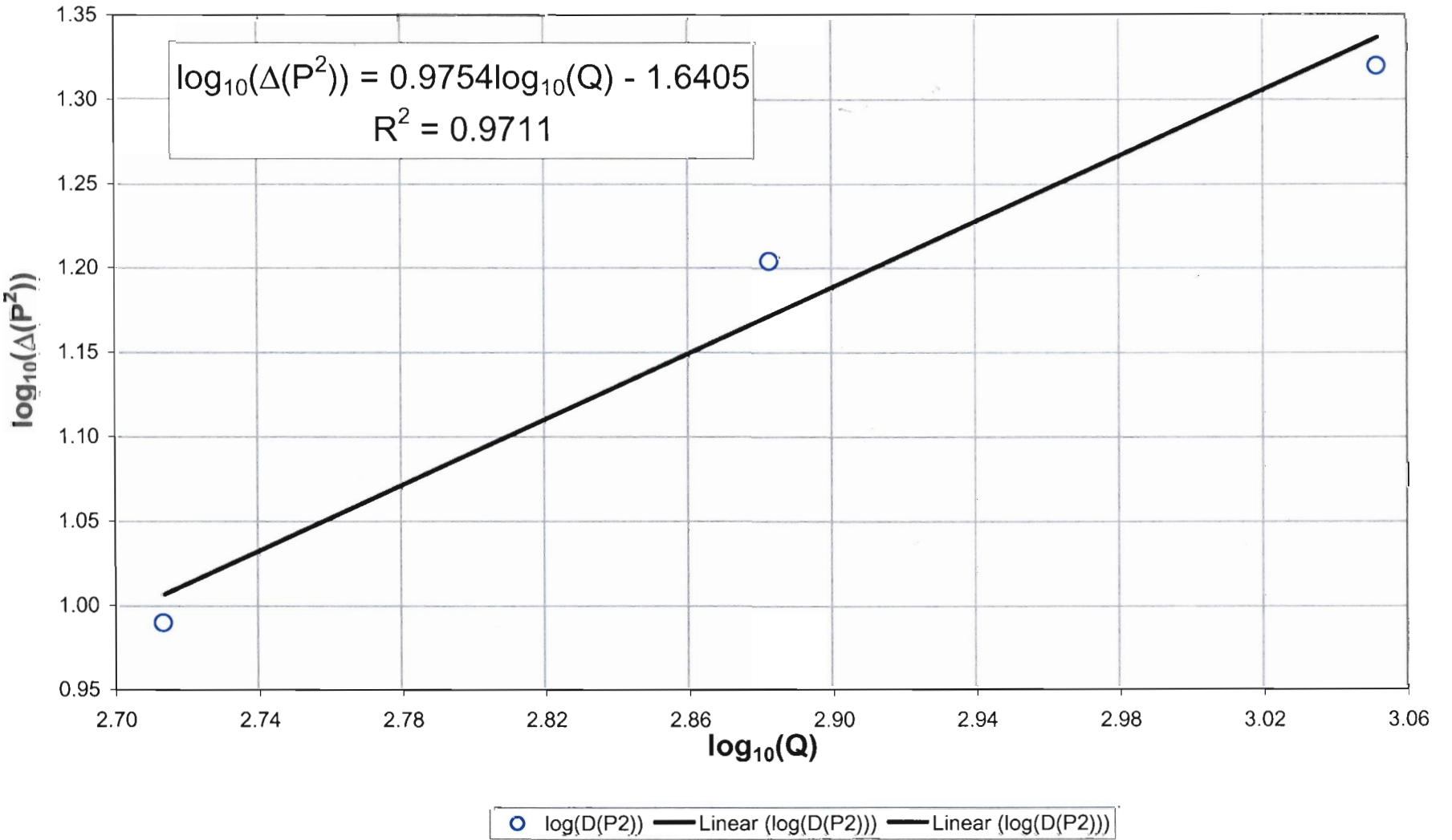
RNM, 01/28/03

Relationship between steady-state differential pressures squared and flowrate:
 If relationship is linear, with the ordinate intercept nearly zero,
 there is no high velocity flow effect.
 V2 Transect: Drillhole 20



Rwn, 01/28/03

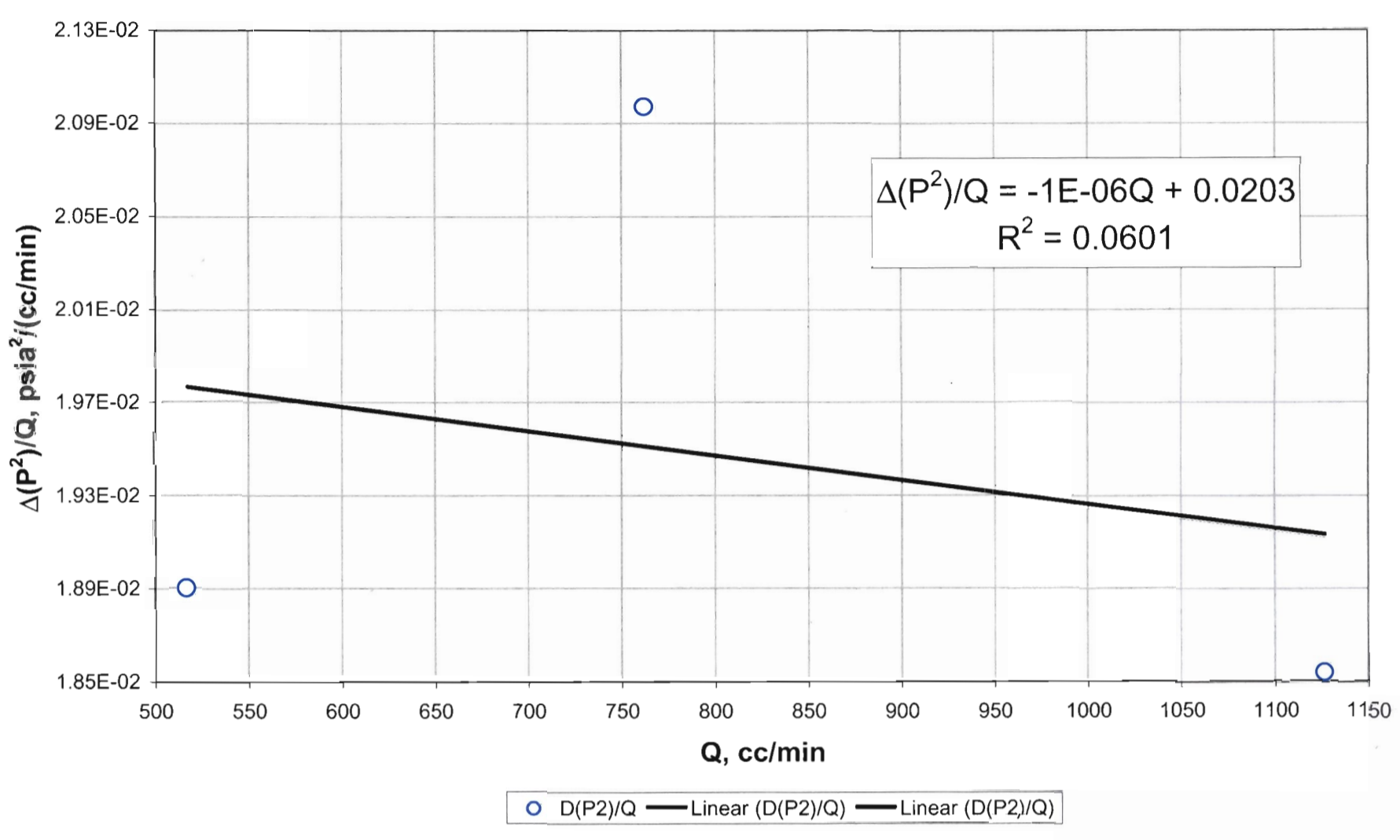
Log-Log plot of differential pressures squared vs. flowrate--used to identify the presence of
 high-velocity flow effects (when the slope is greater than unity)
 V2 Transect: Drillhole 20



Rwn, 01/28/03

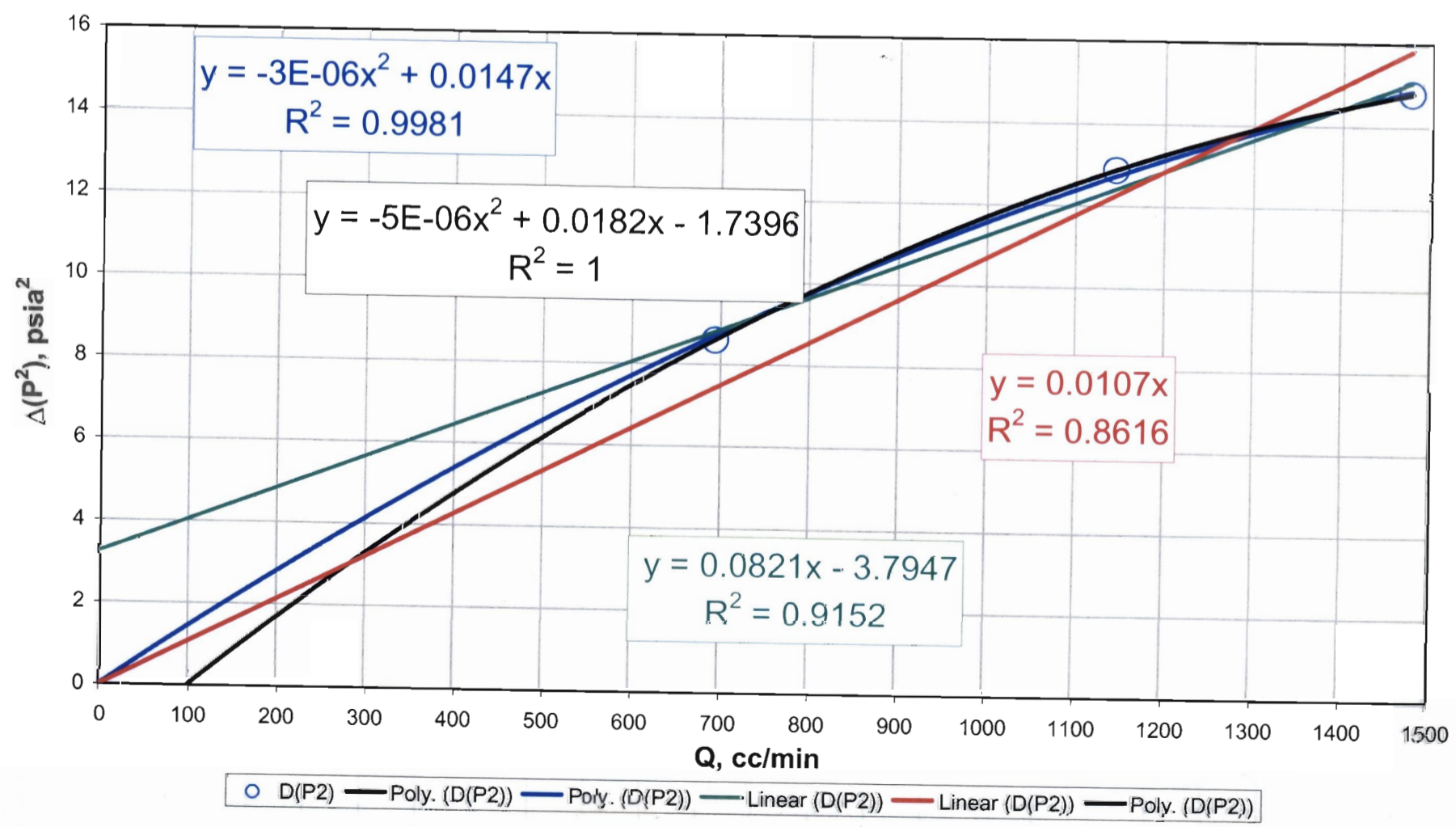
Final check for high velocity flow effects:
 High velocity flow effects are present when the slope is non-zero and positive.
 V2 Transect: Drillhole 20

Rmn 01/18/03

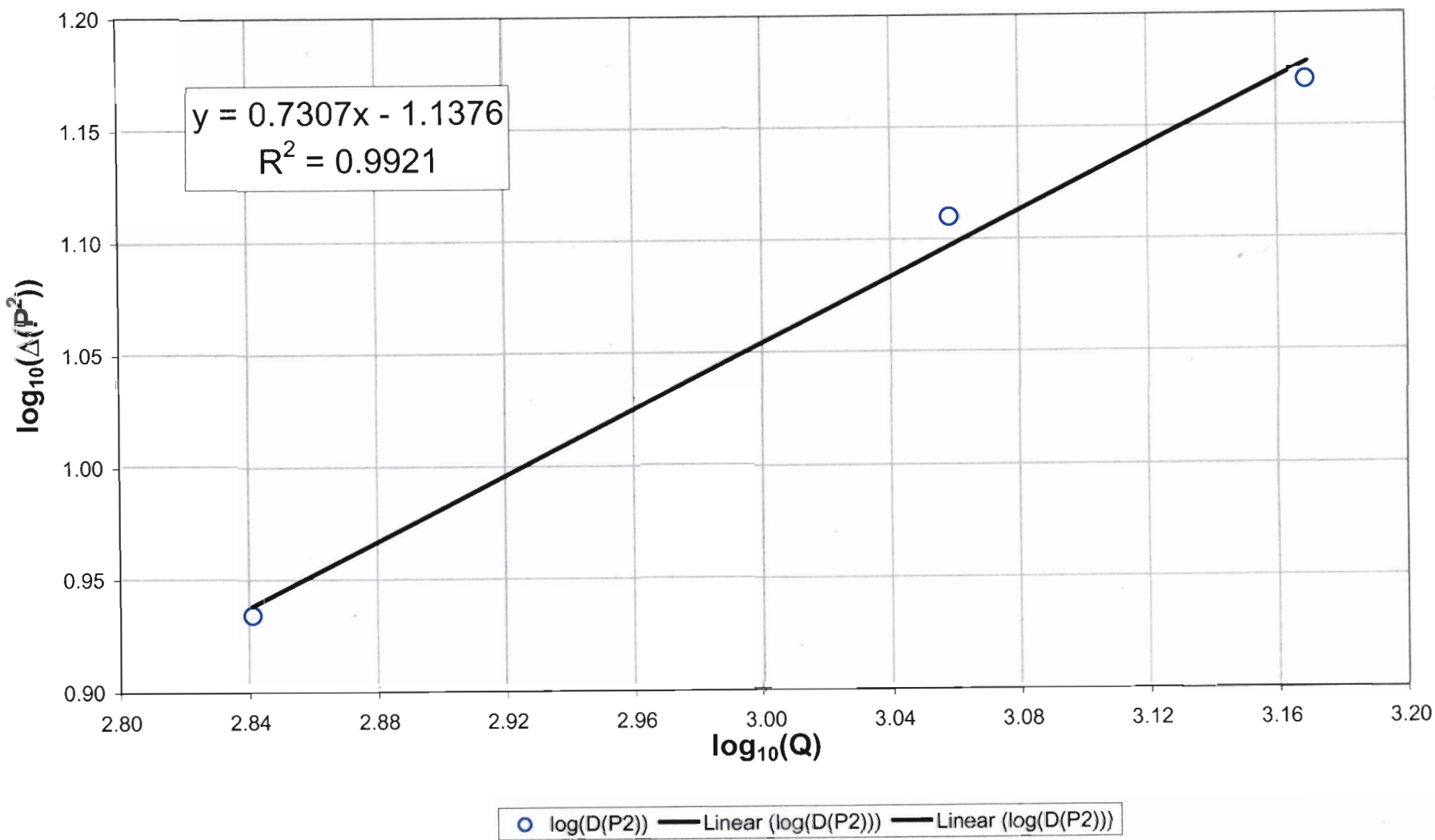


Relationship between steady-state differential pressures squared and flowrate:
 If relationship is linear, with the ordinate intercept nearly zero,
 there is no high velocity flow effect.
 V2 Transect: Drillhole 21

Rmn 01/18/03

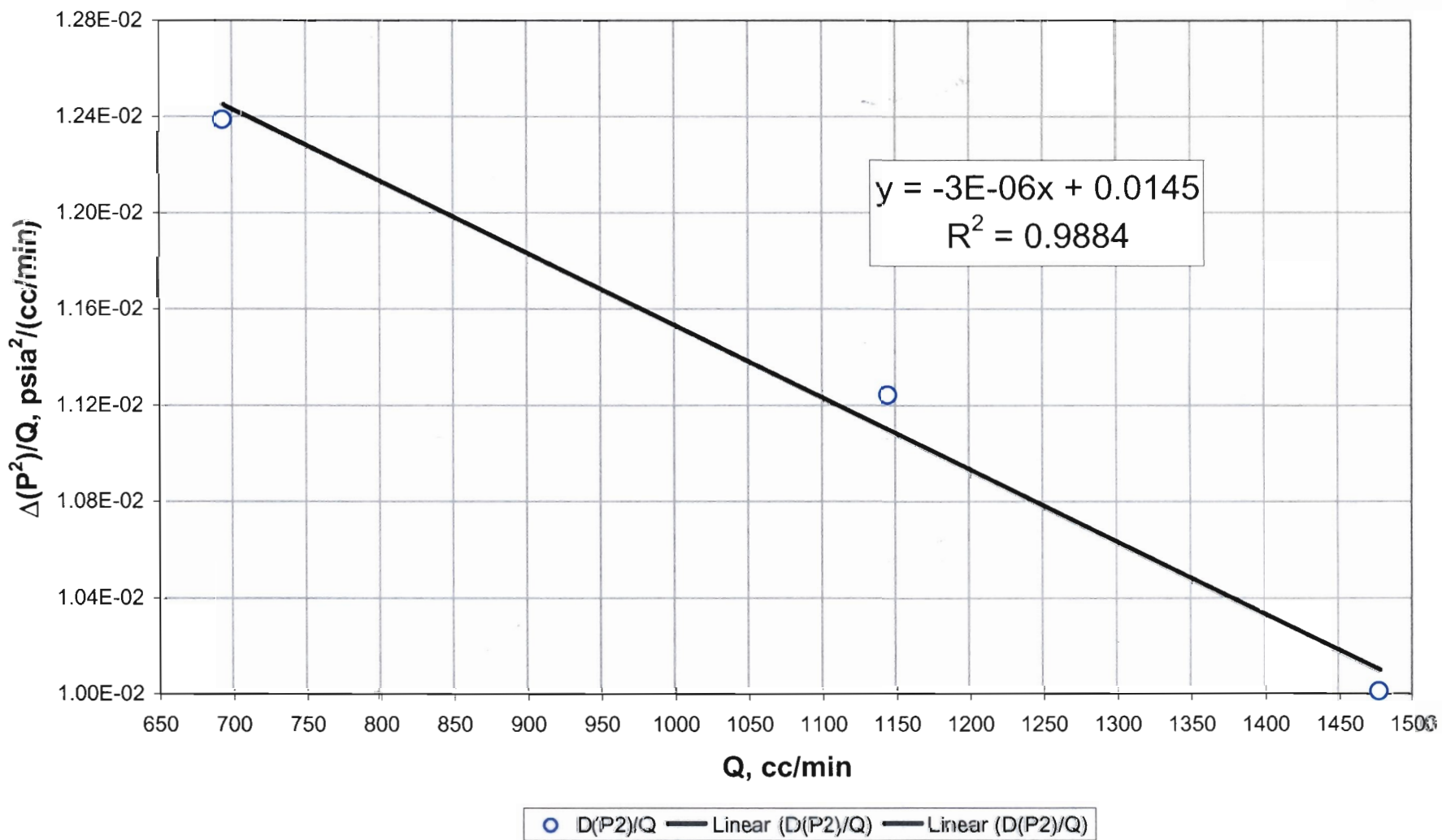


Log-Log plot of differential pressures squared vs. flowrate--used to identify the presence of high-velocity flow effects (when the slope is greater than unity)
V2 Transect: Drillhole 21



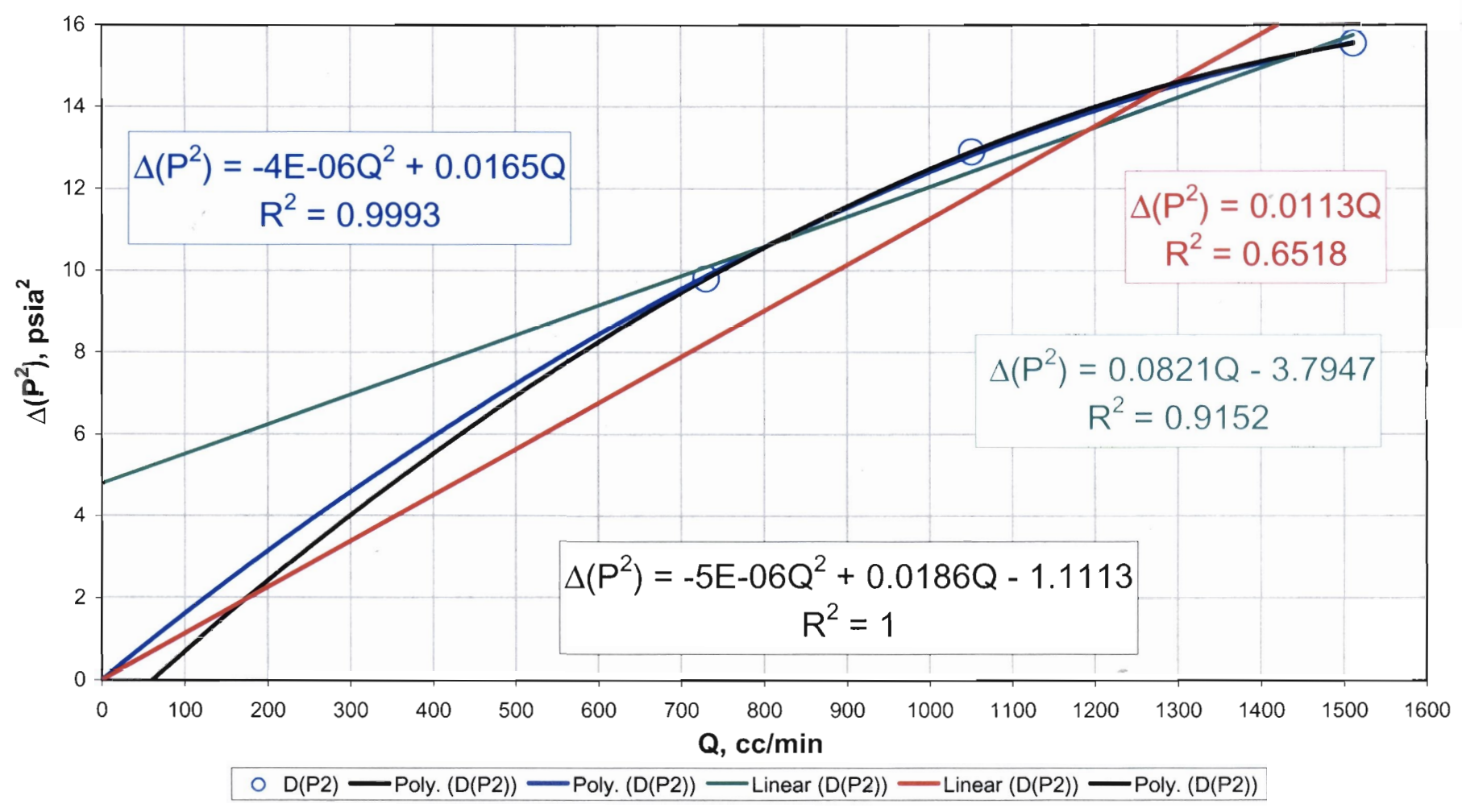
RMM, 01/28/03

Final check for high velocity flow effects:
High velocity flow effects are present when the slope is non-zero and positive.
V2 Transect: Drillhole 21

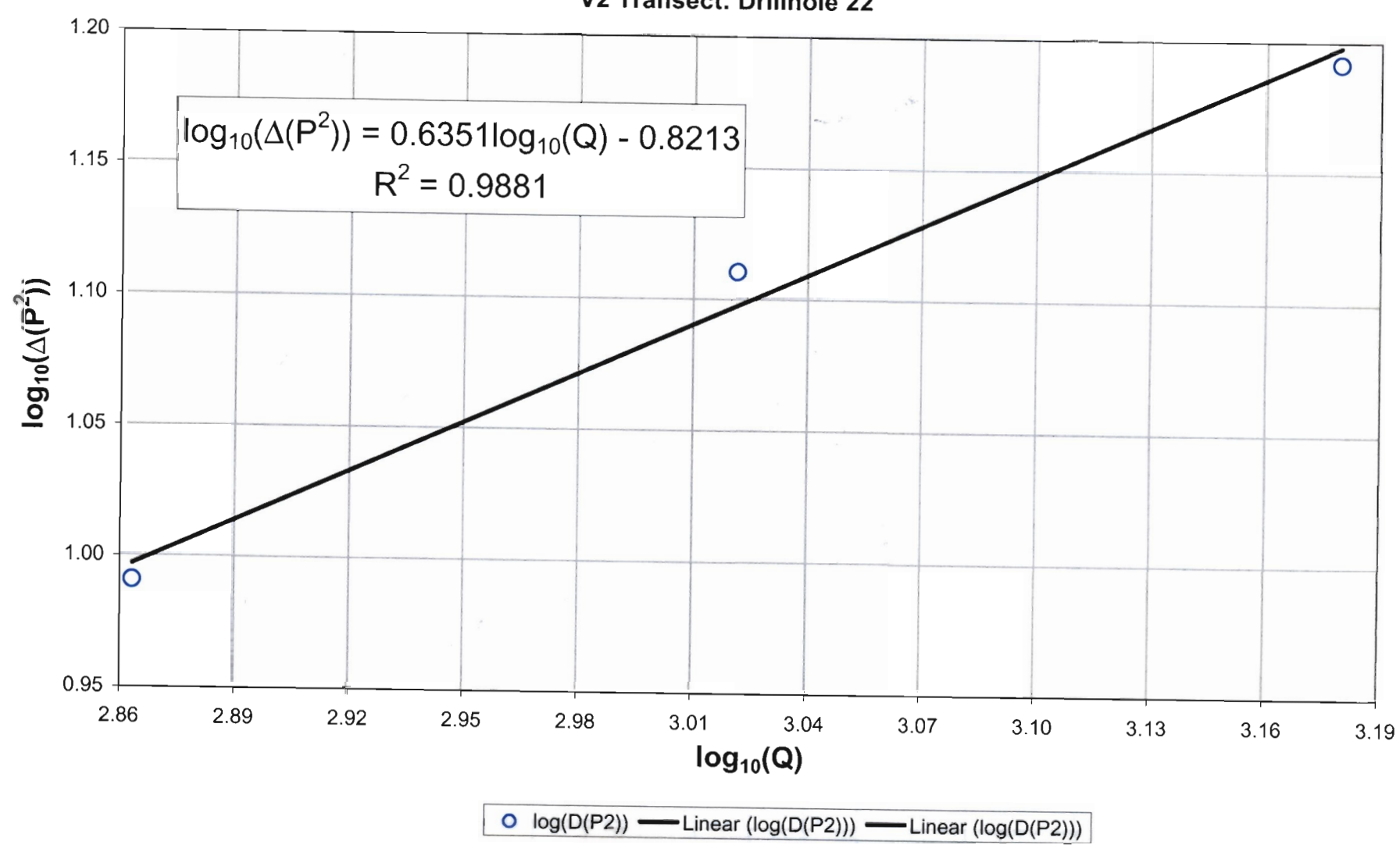


RMM, 01/28/03

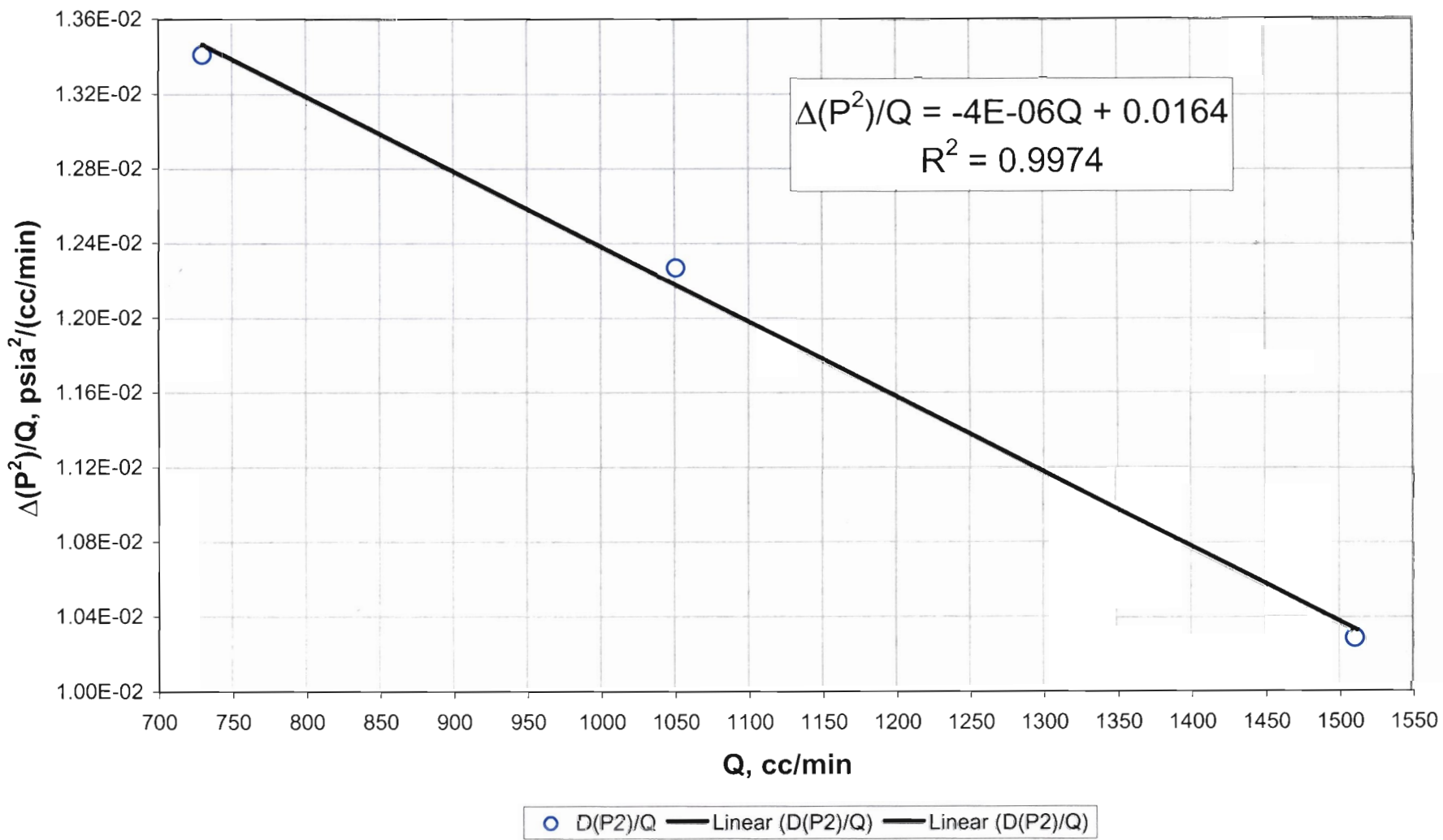
Relationship between steady-state differential pressures squared and flowrate:
 If relationship is linear, with the ordinate intercept nearly zero,
 there is no high velocity flow effect.
 V2 Transect: Drillhole 22



Log-Log plot of differential pressures squared vs. flowrate--used to identify the presence of
 high-velocity flow effects (when the slope is greater than unity)
 V2 Transect: Drillhole 22

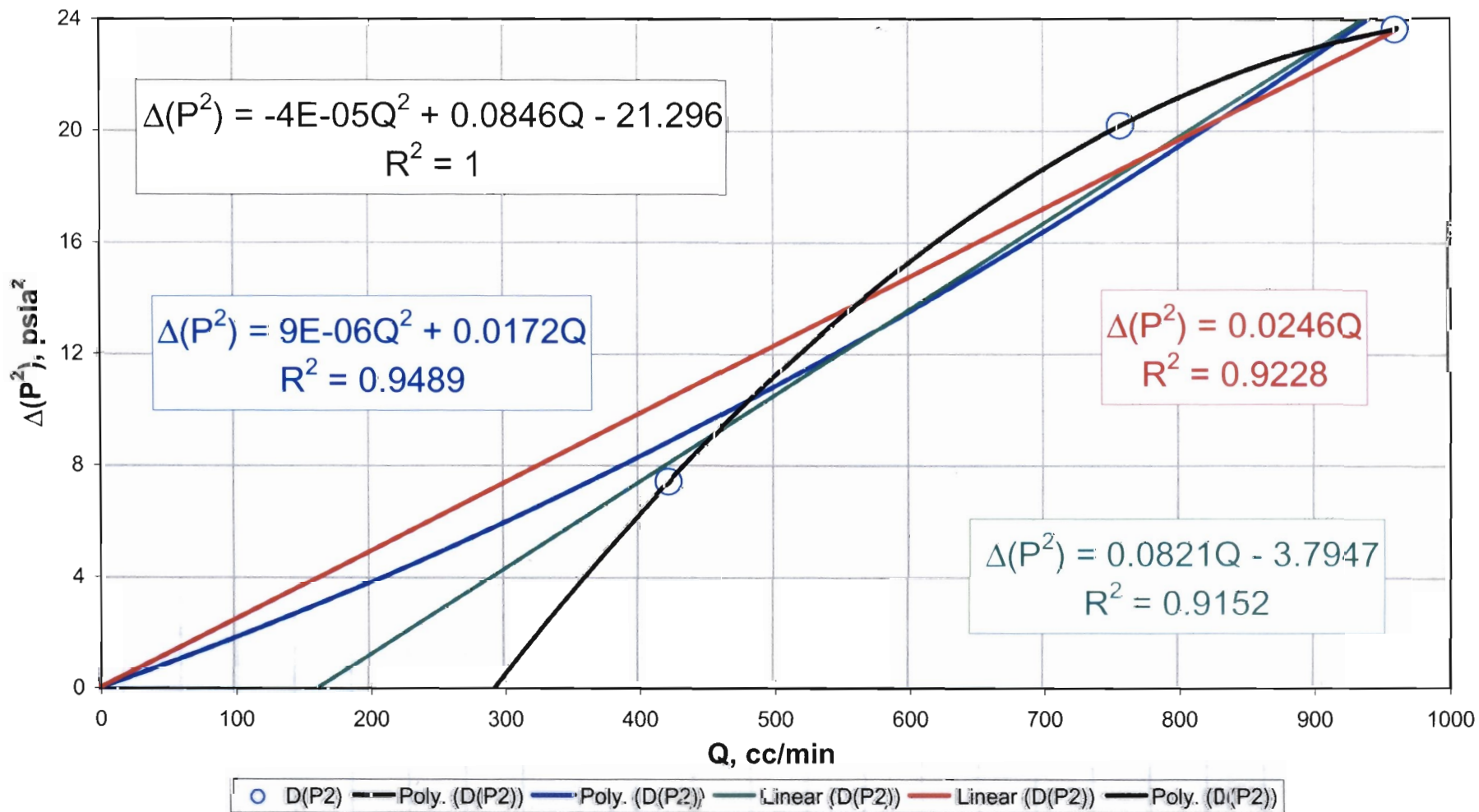


Final check for high velocity flow effects:
 High velocity flow effects are present when the slope is non-zero and positive.
 V2 Transect: Drillhole 22



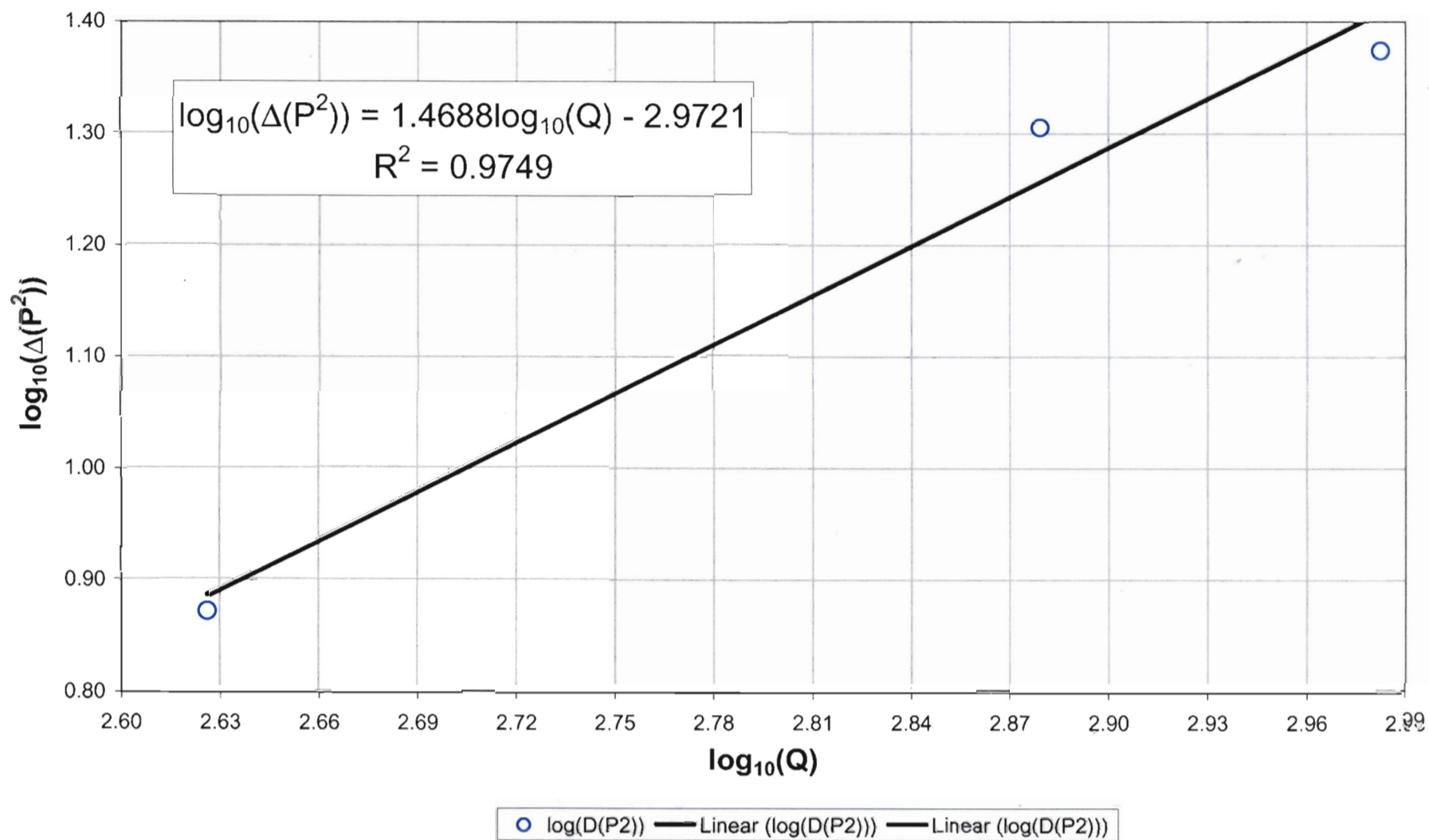
RMM, 01/28/03

Relationship between steady-state differential pressures squared and flowrate:
 If relationship is linear, with the ordinate intercept nearly zero,
 there is no high velocity flow effect.
 V2 Transect: Drillhole 23



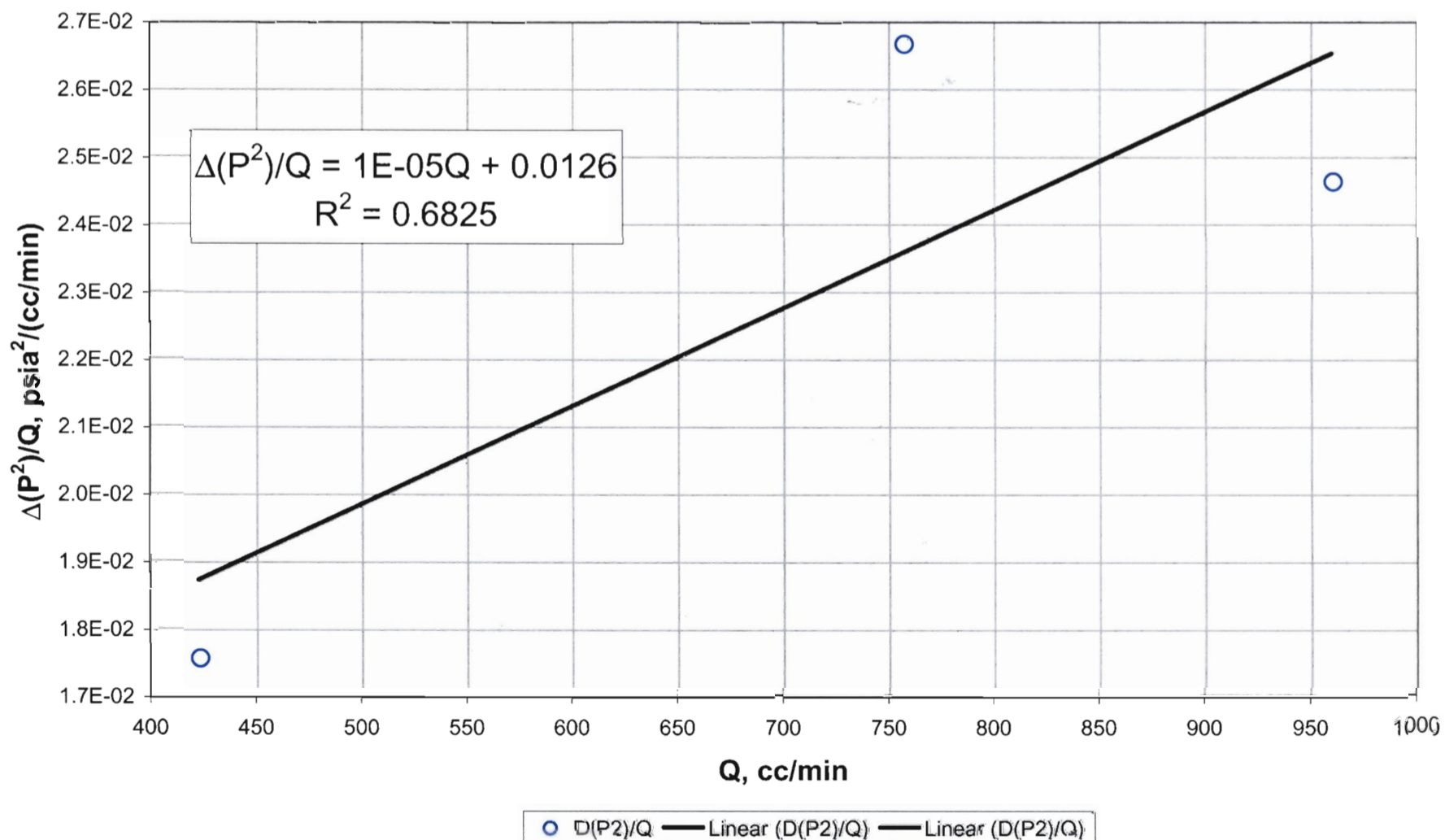
RMM, 01/28/03

Log-Log plot of differential pressures squared vs. flowrate--used to identify the presence of high-velocity flow effects (when the slope is greater than unity)
 V2 Transect: Drillhole 23



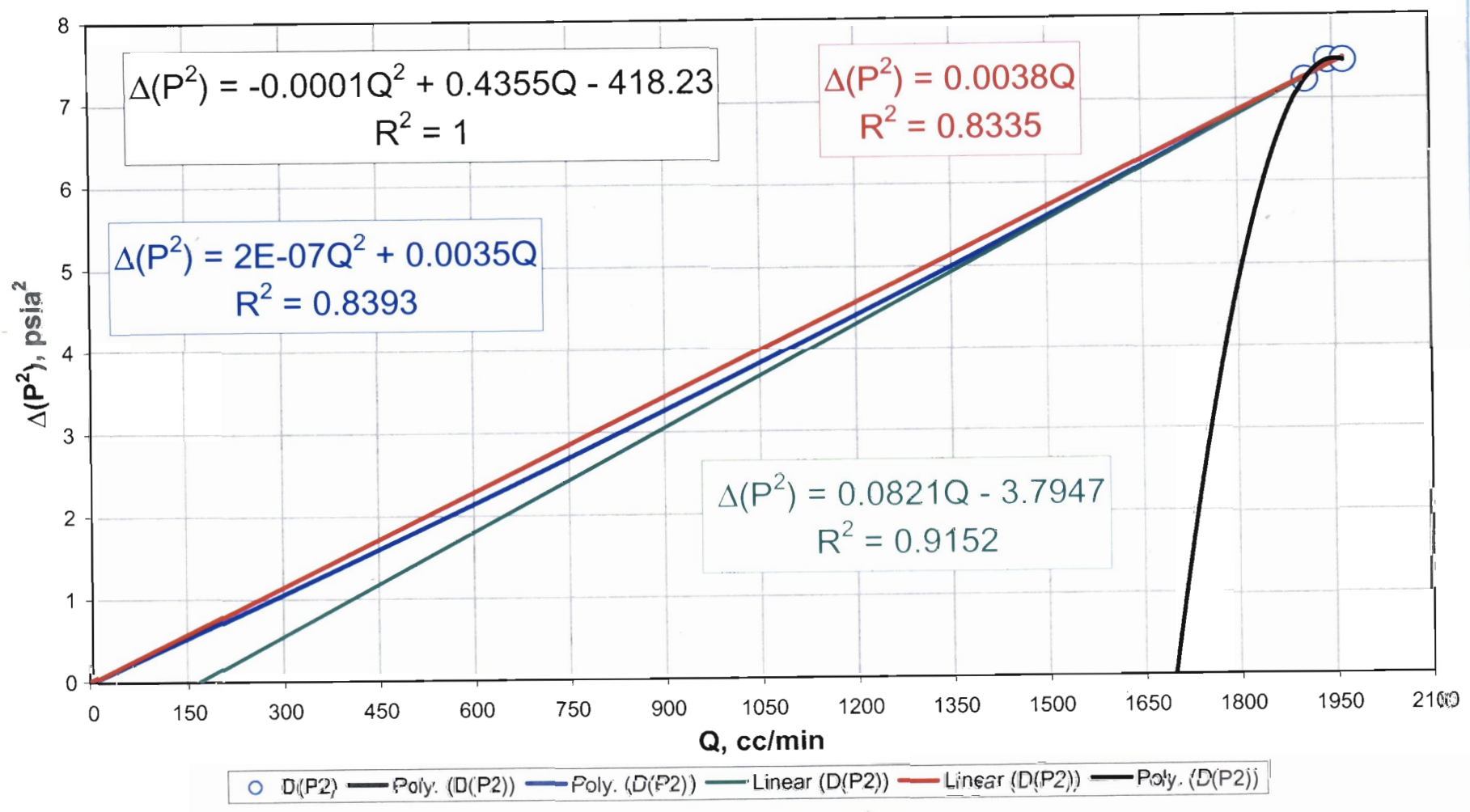
Run, 01/18/03

Final check for high velocity flow effects:
 High velocity flow effects are present when the slope is non-zero and positive.
 V2 Transect: Drillhole 23



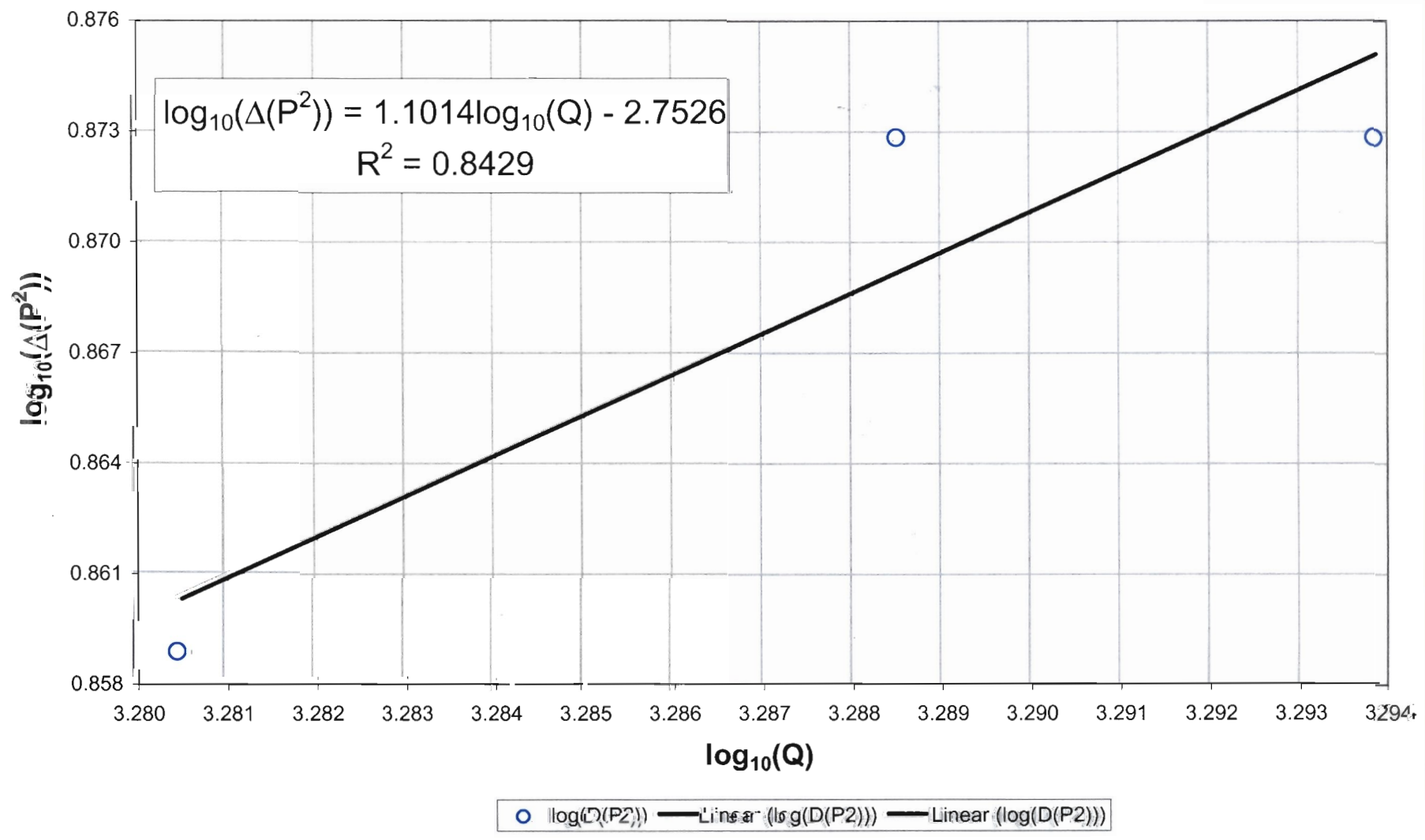
Run, 01/18/03

Relationship between steady-state differential pressures squared and flowrate:
 If relationship is linear, with the ordinate intercept nearly zero,
 there is no high velocity flow effect.
 V2 Transect: Drillhole 24



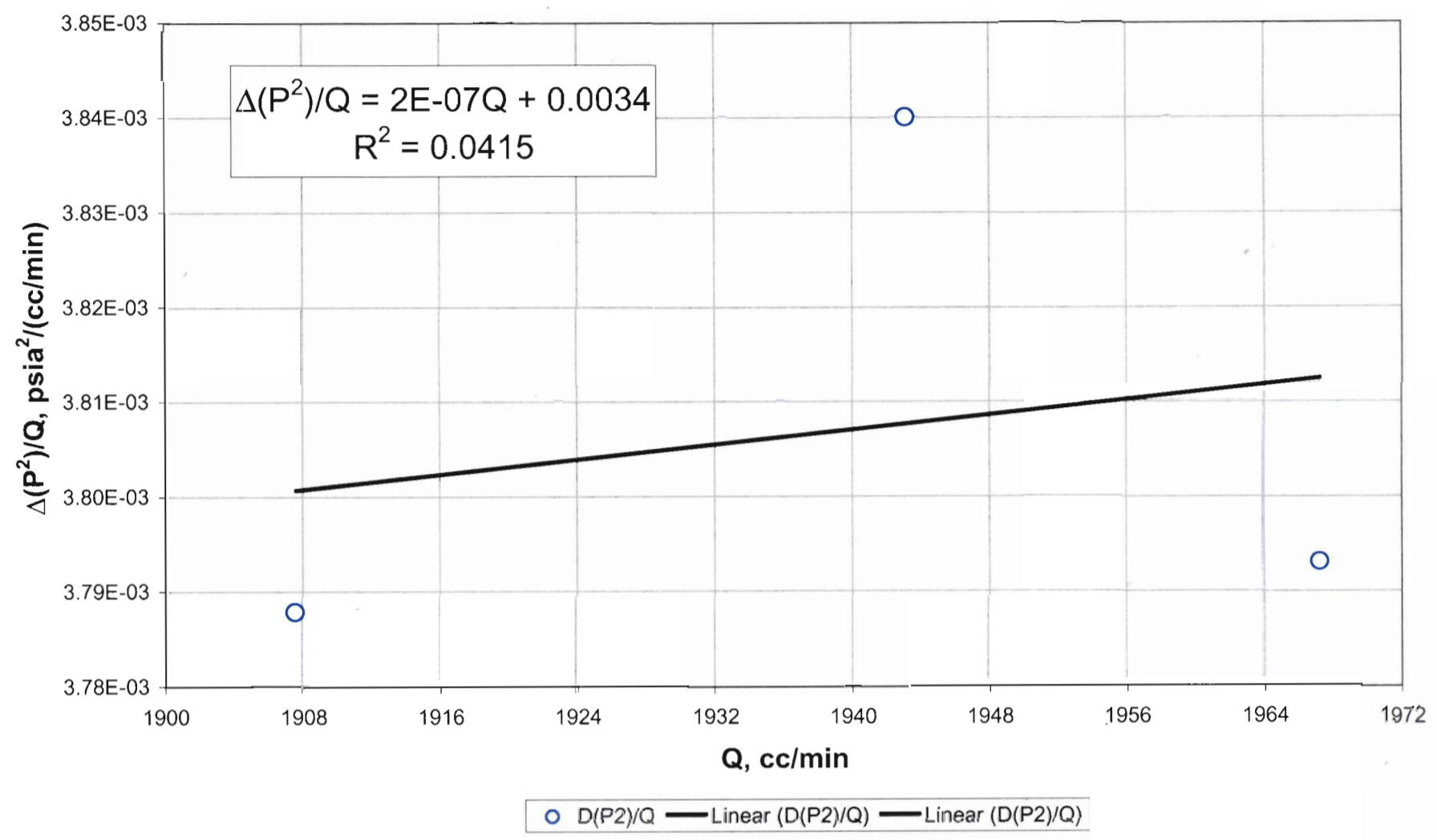
Rmn, 01/08/03

Log-Log plot of differential pressures squared vs. flowrate--used to identify the presence of
 high-velocity flow effects (when the slope is greater than unity)
 V2 Transect: Drillhole 24



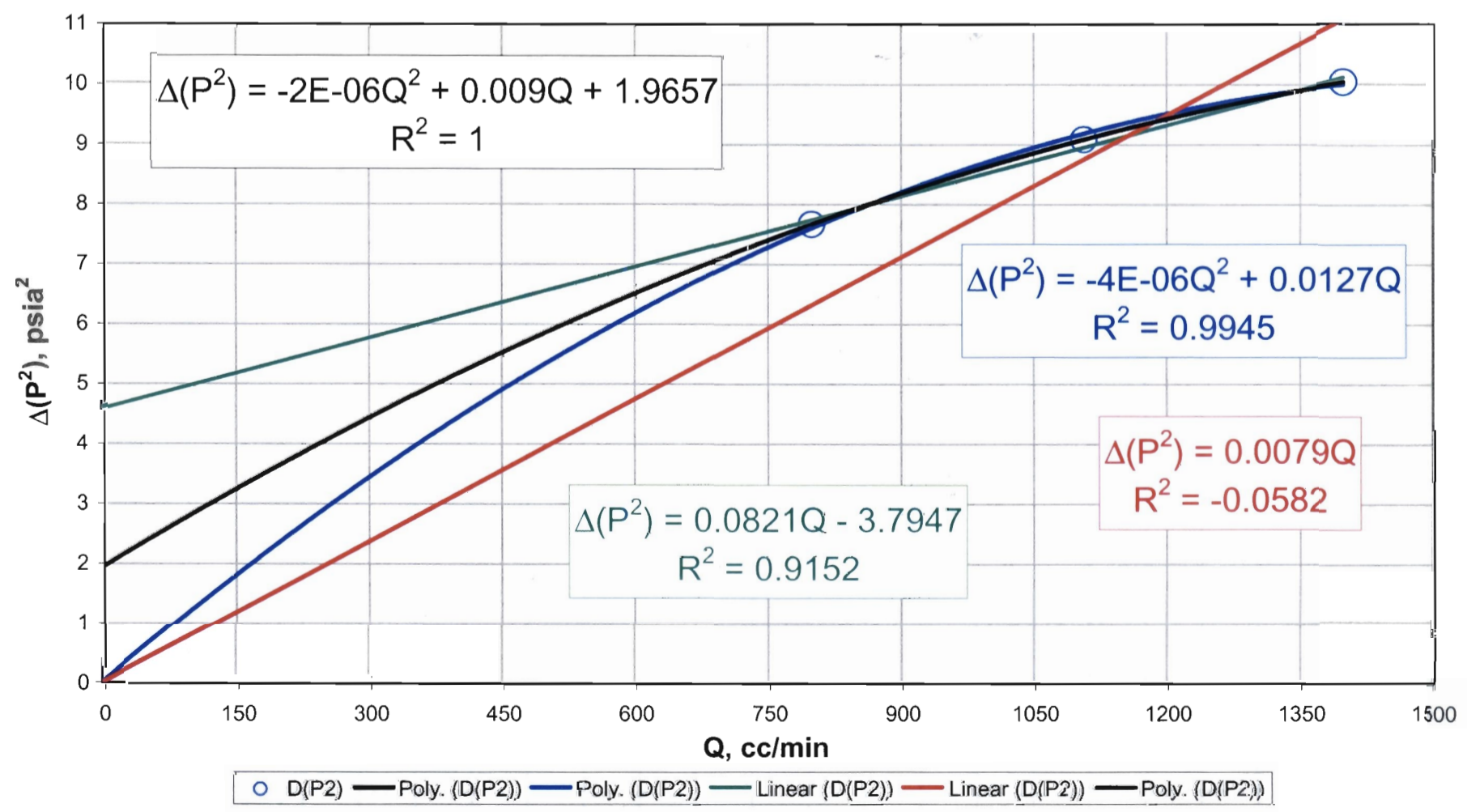
Rmn, 01/08/03

Final check for high velocity flow effects:
 High velocity flow effects are present when the slope is non-zero and positive.
 V2 Transect: Drillhole 24



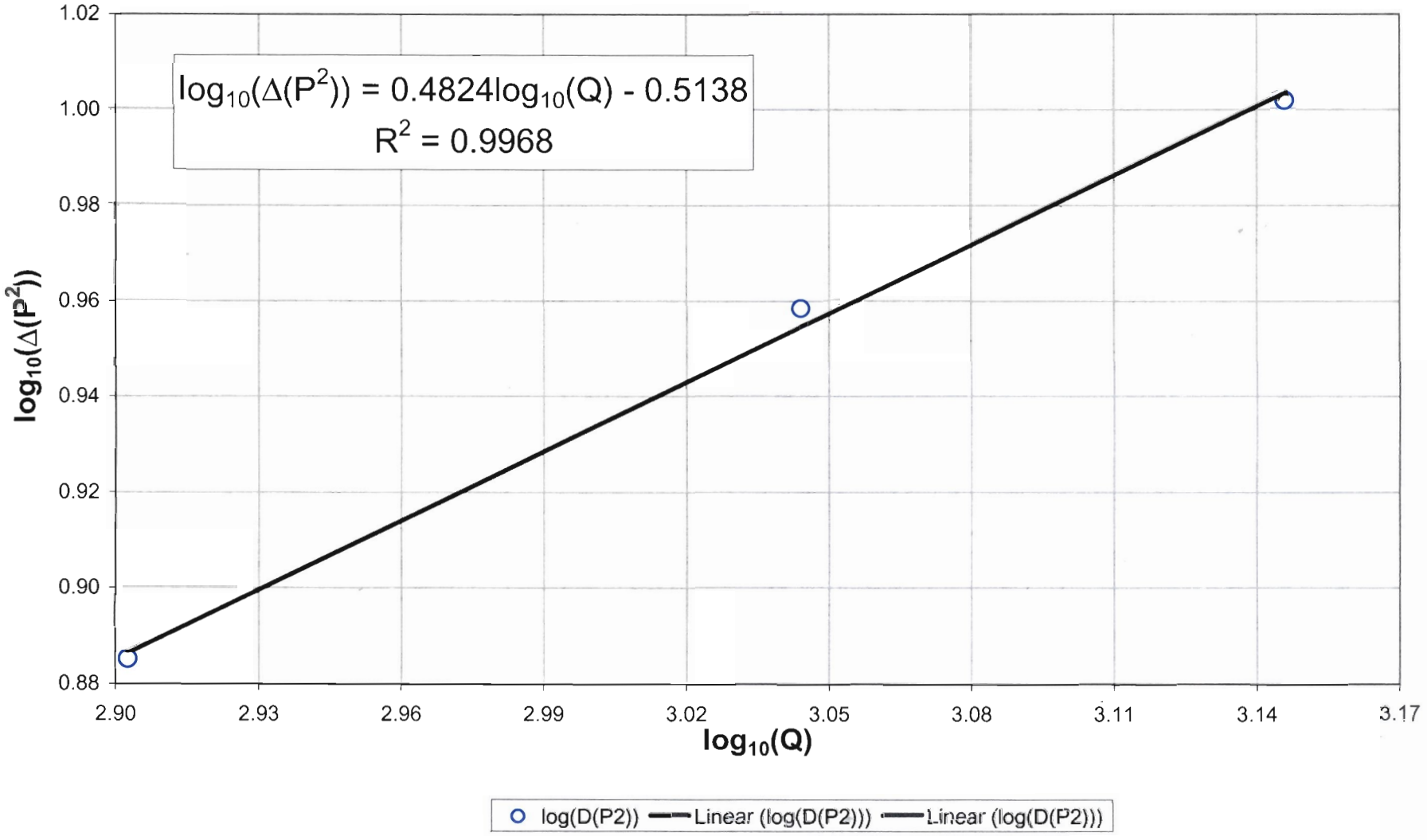
Rmn, 01/18/07

Relationship between steady-state differential pressures squared and flowrate:
 If relationship is linear, with the ordinate intercept nearly zero,
 there is no high velocity flow effect.
 V2 Transect: Drillhole 25



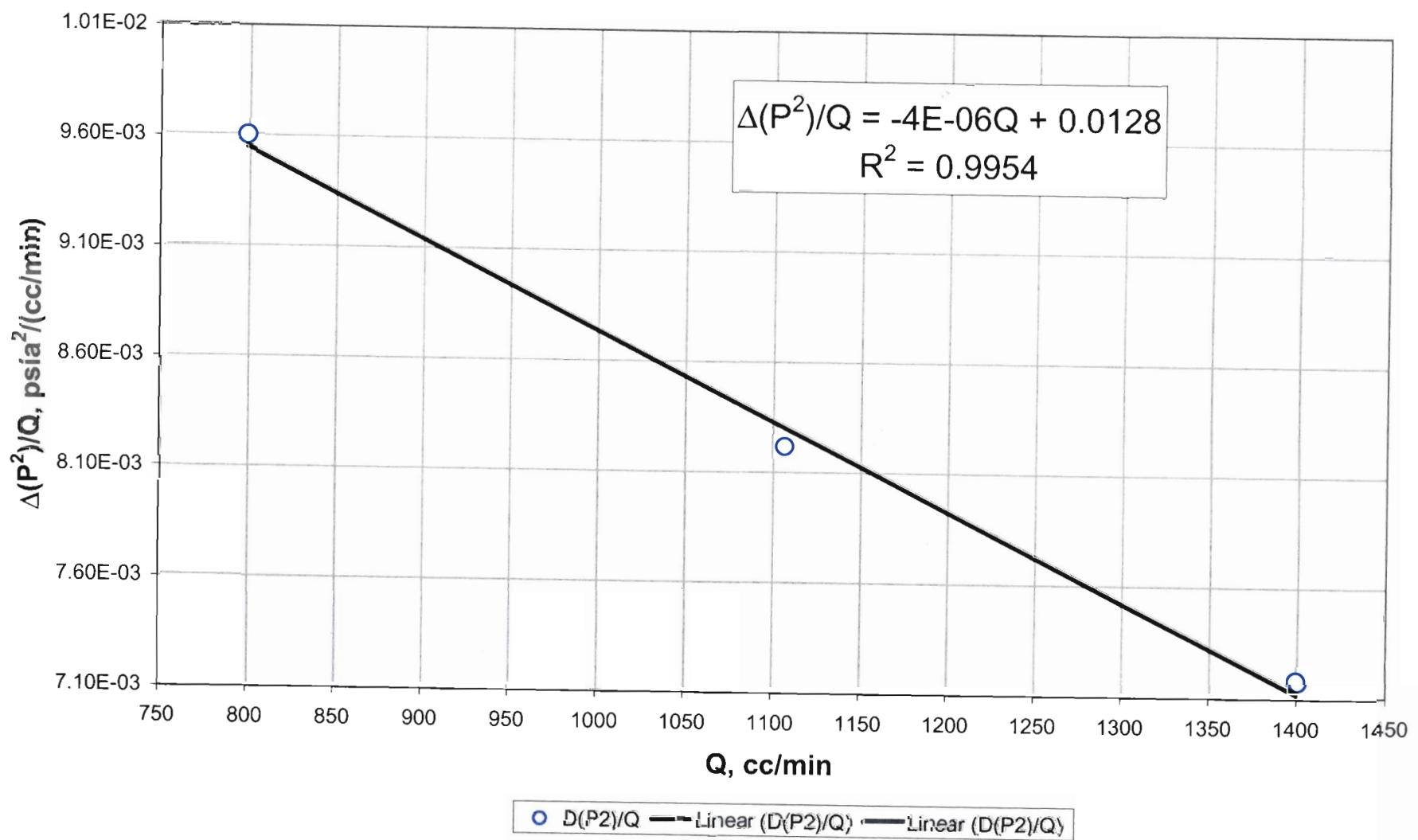
Rmn, 01/18/07

Log-Log plot of differential pressures squared vs. flowrate--used to identify the presence of high-velocity flow effects (when the slope is greater than unity)
 V2 Transect: Drillhole 25



Rmn, 01/28/03

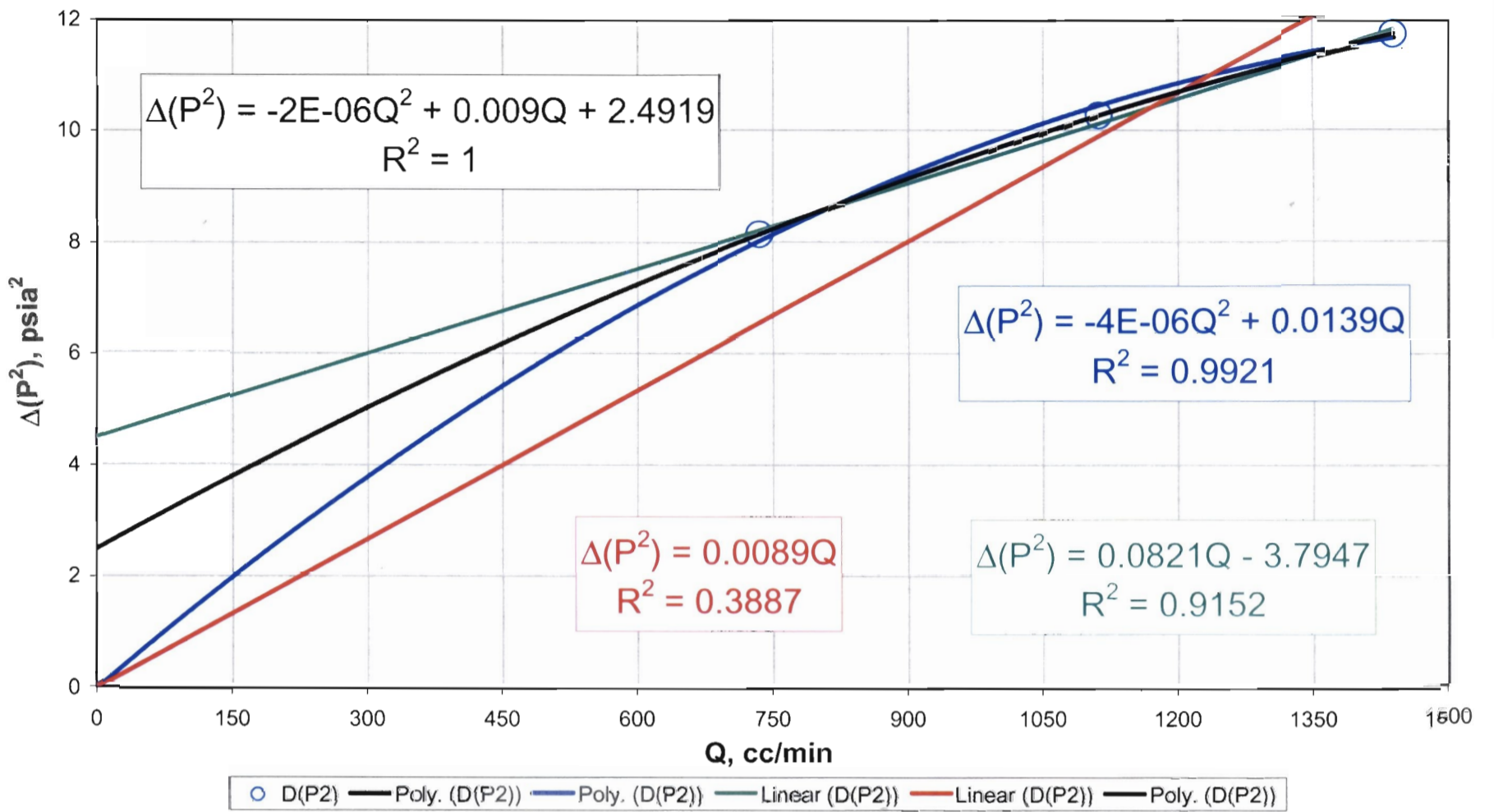
Final check for high velocity flow effects:
 High velocity flow effects are present when the slope is non-zero and positive.
 V2 Transect: Drillhole 25



Rmn, 01/28/03

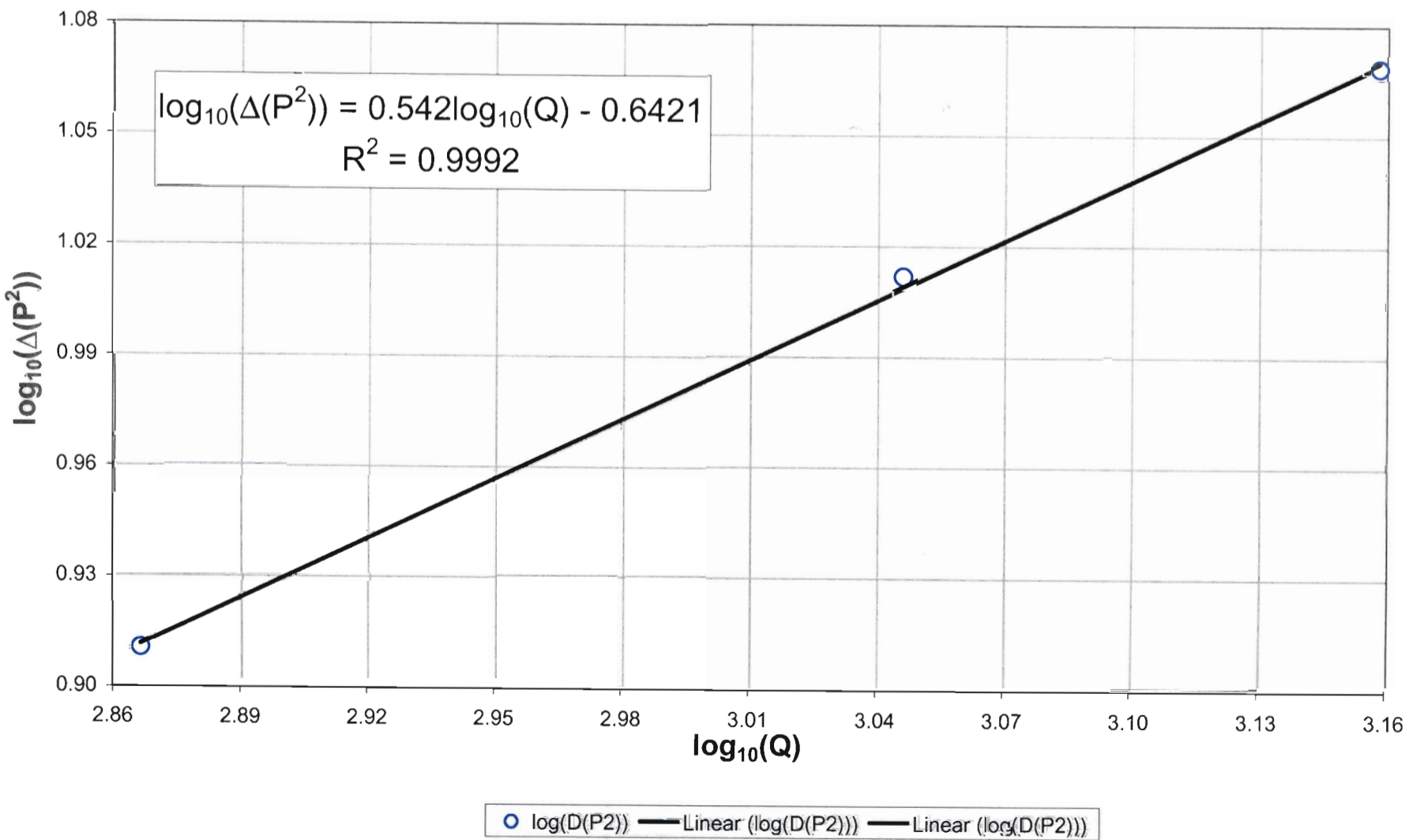
Relationship between steady-state differential pressures squared and flowrate:
 If relationship is linear, with the ordinate intercept nearly zero,
 there is no high velocity flow effect.
 V2 Transect: Drillhole 26

RNM, 01/28/03

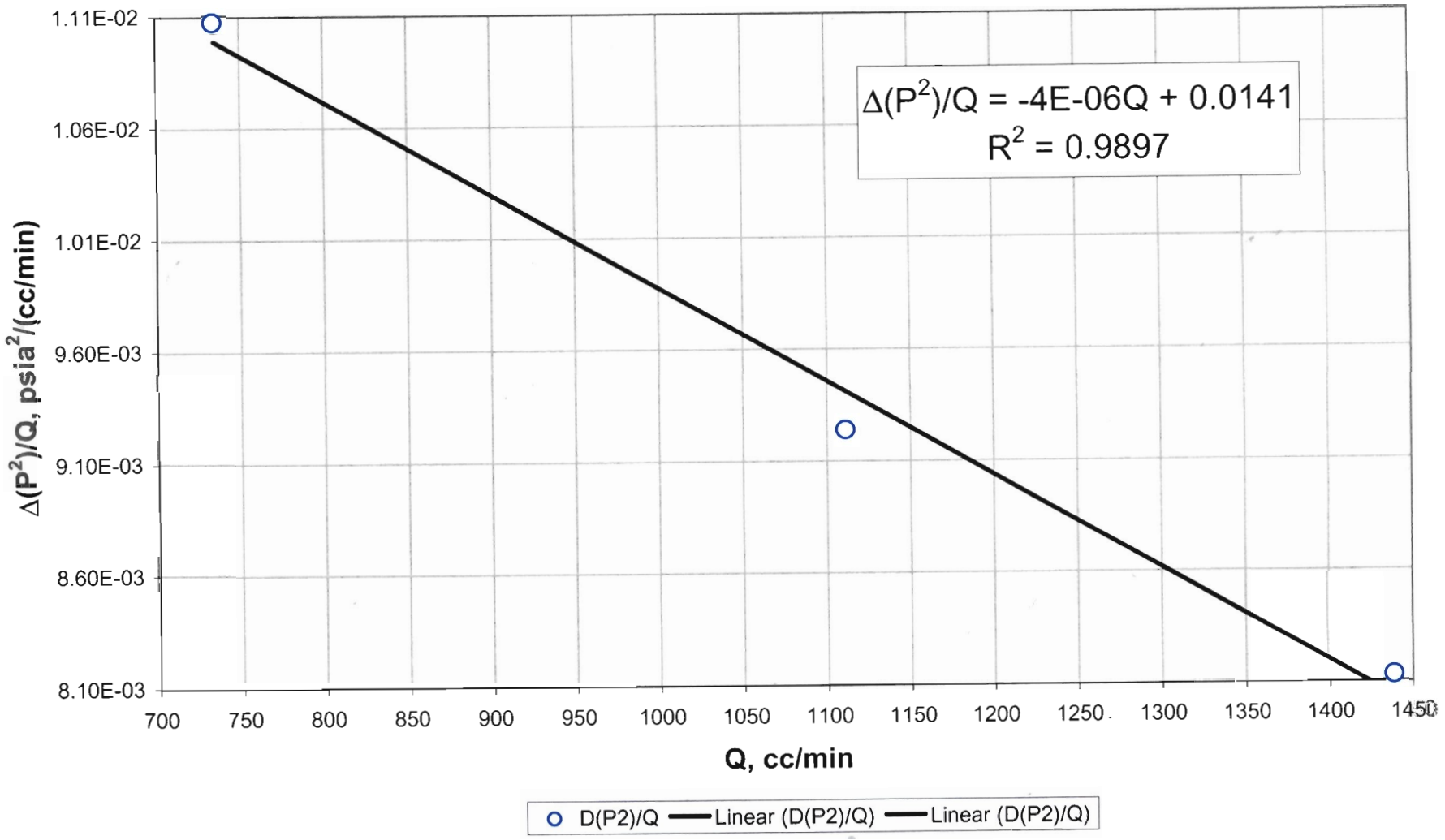


Log-Log plot of differential pressures squared vs. flowrate--used to identify the presence of
 high-velocity flow effects (when the slope is greater than unity)
 V2 Transect: Drillhole 26

RNM, 01/28/03

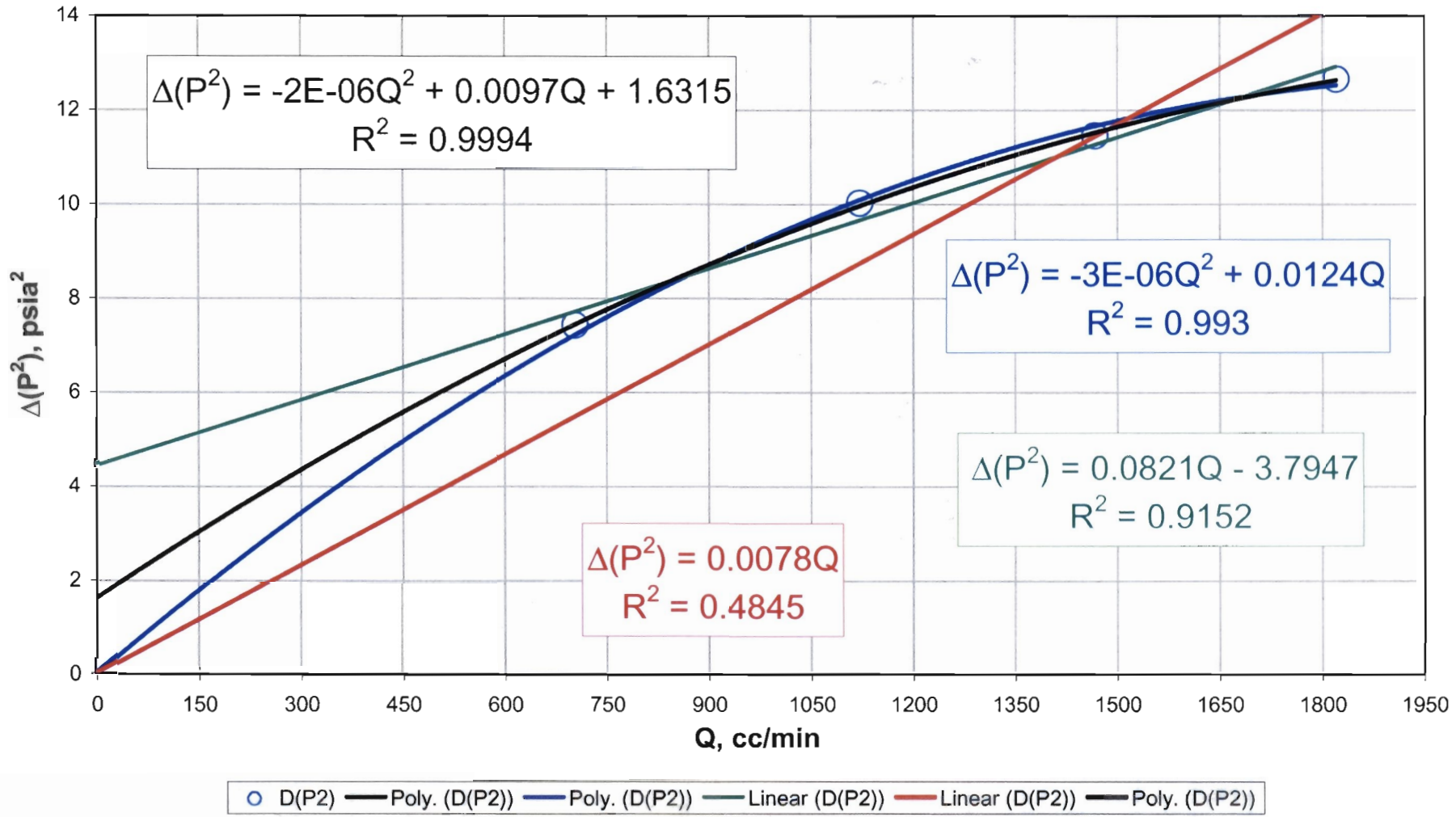


Final check for high velocity flow effects:
 High velocity flow effects are present when the slope is non-zero and positive.
 V2 Transect: Drillhole 26



Rm 1, 01/28/03

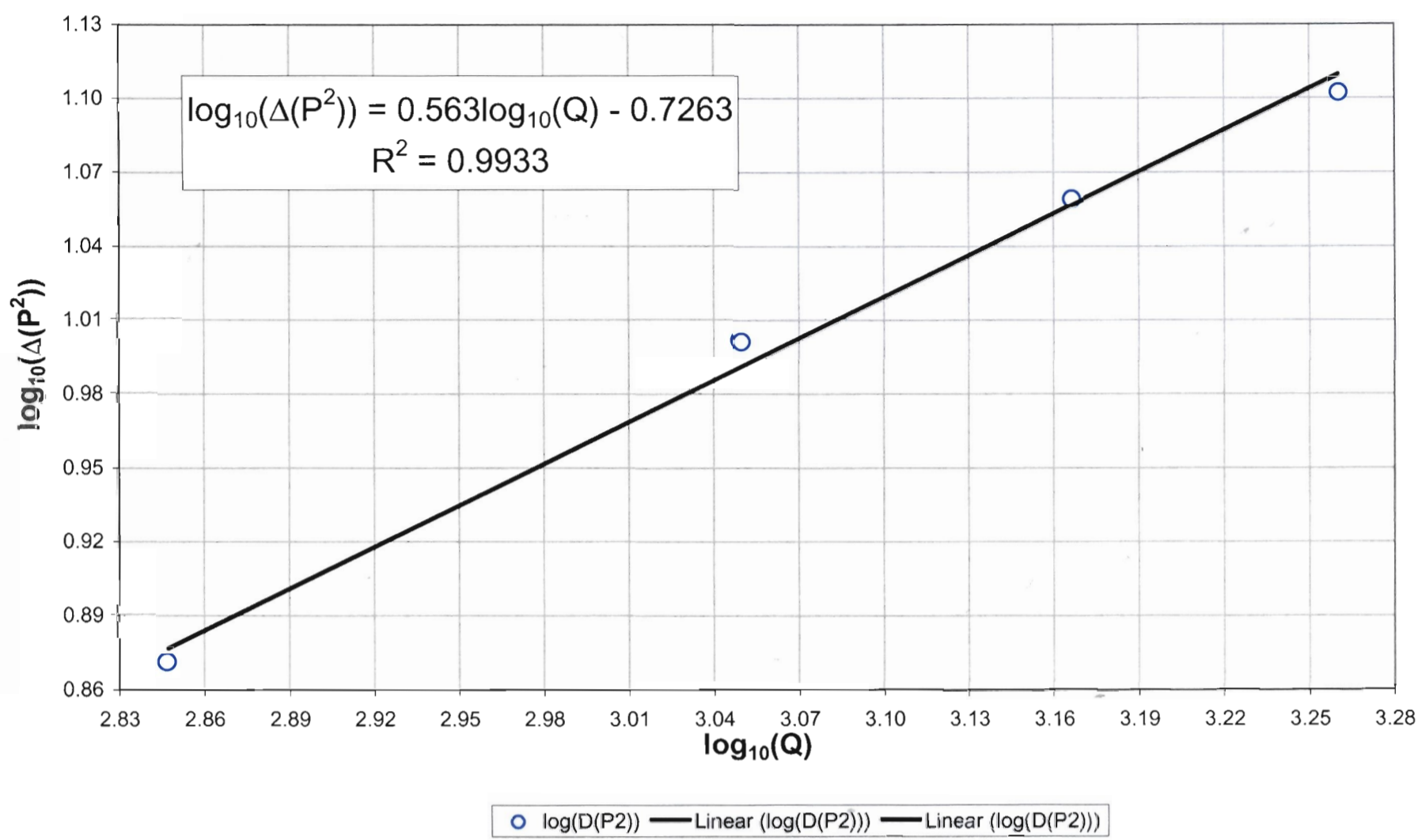
Relationship between steady-state differential pressures squared and flowrate:
 If relationship is linear, with the ordinate intercept nearly zero,
 there is no high velocity flow effect.
 V2 Transect: Drillhole 27



Rm 1, 01/28/03

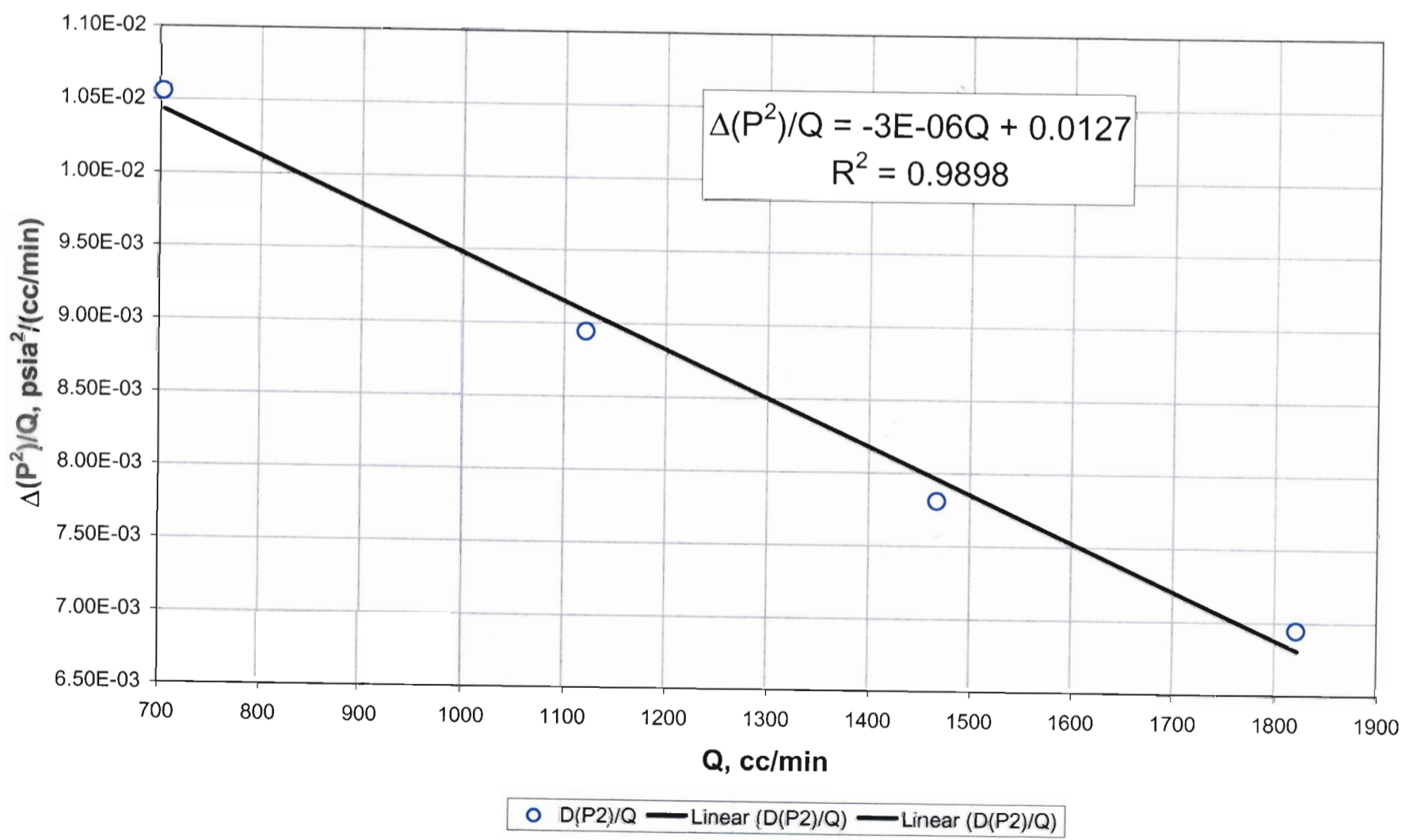
Log-Log plot of differential pressures squared vs. flowrate--used to identify the presence of high-velocity flow effects (when the slope is greater than unity)
V2 Transect: Drillhole 27

Run, 01/18/03



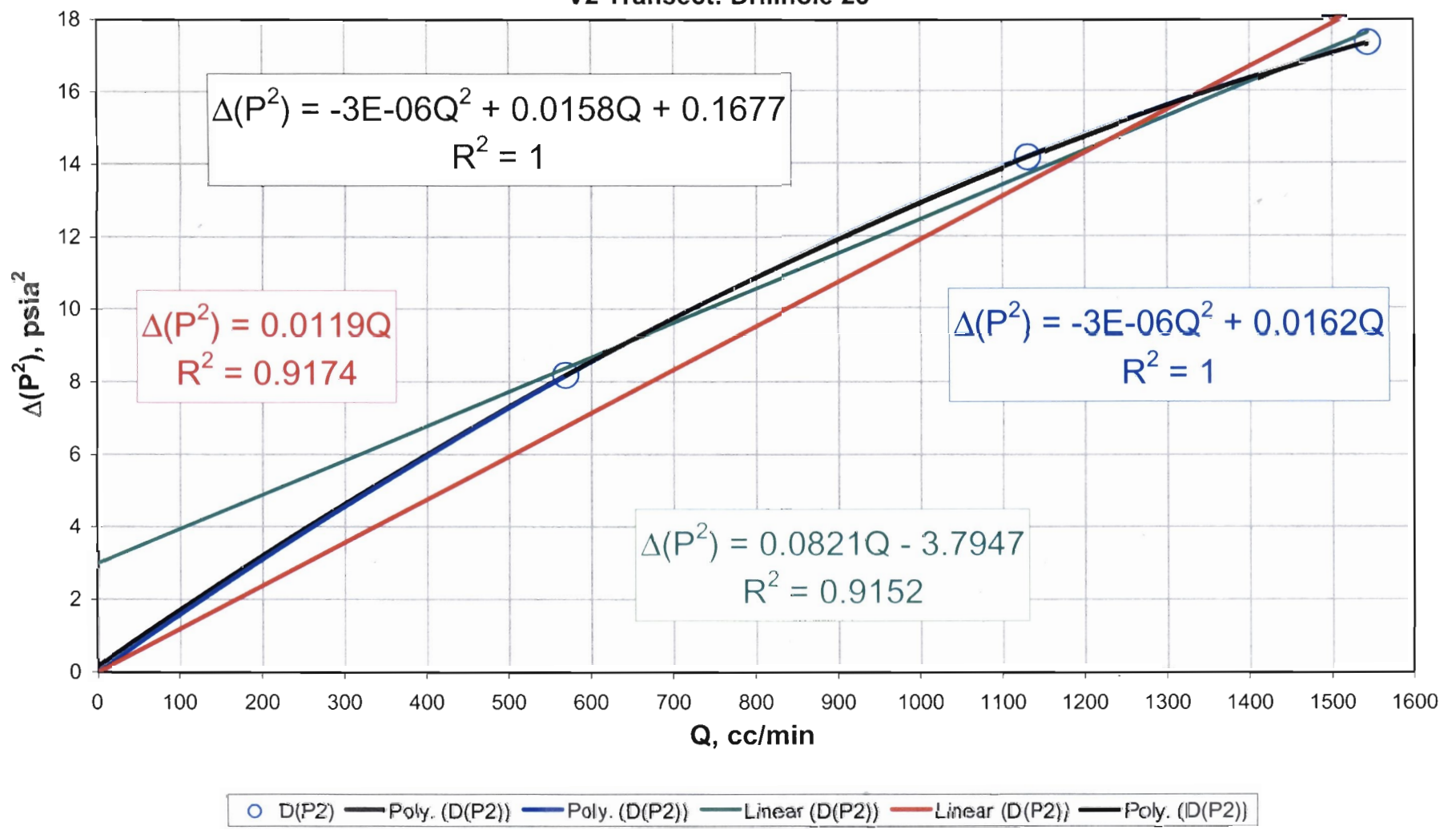
Final check for high velocity flow effects:
High velocity flow effects are present when the slope is non-zero and positive.
V2 Transect: Drillhole 27

Run, 01/18/03



Relationship between steady-state differential pressures squared and flowrate:
 If relationship is linear, with the ordinate intercept nearly zero,
 there is no high velocity flow effect.

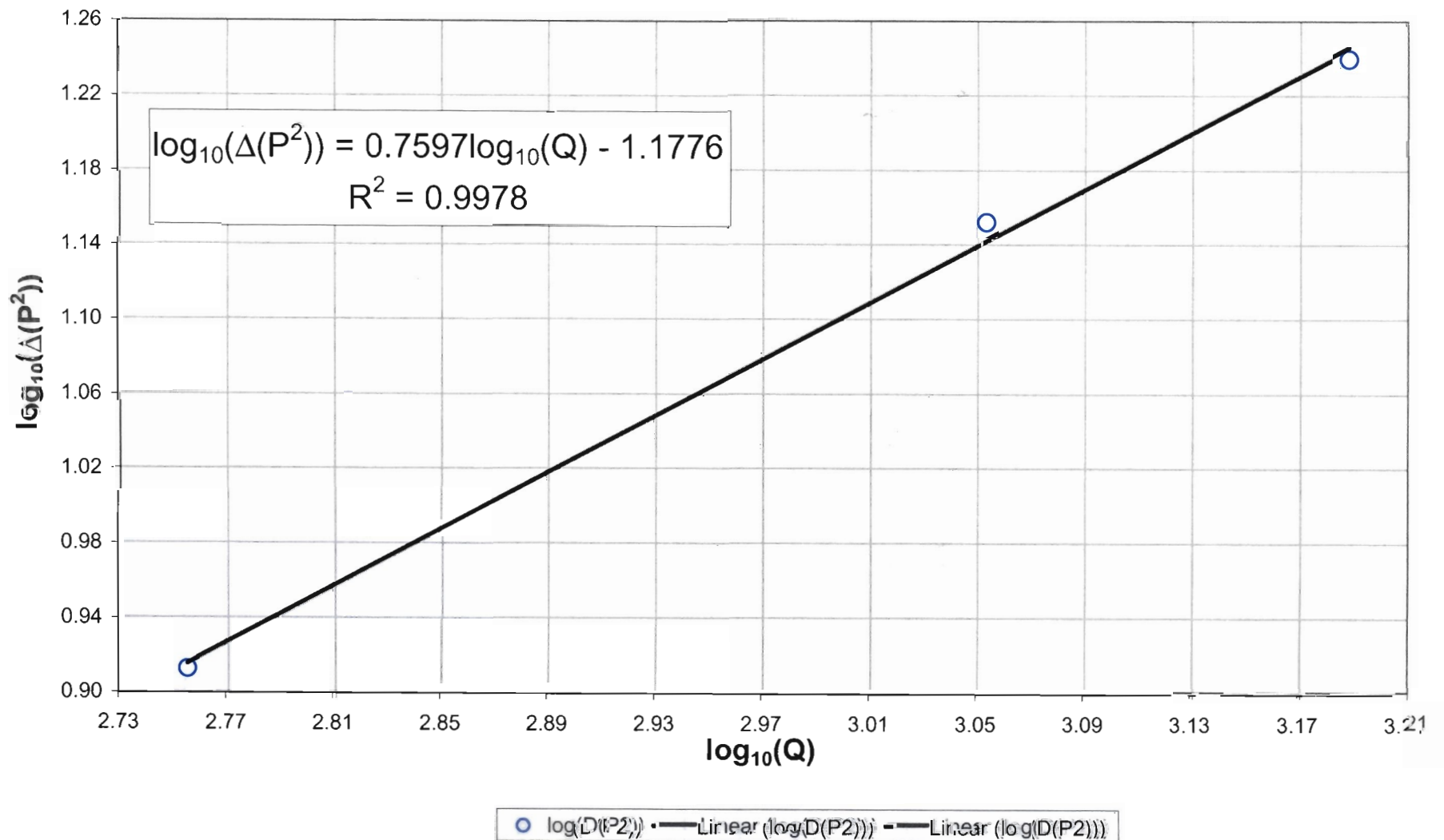
V2 Transect: Drillhole 28



Rmn, 01/28/03

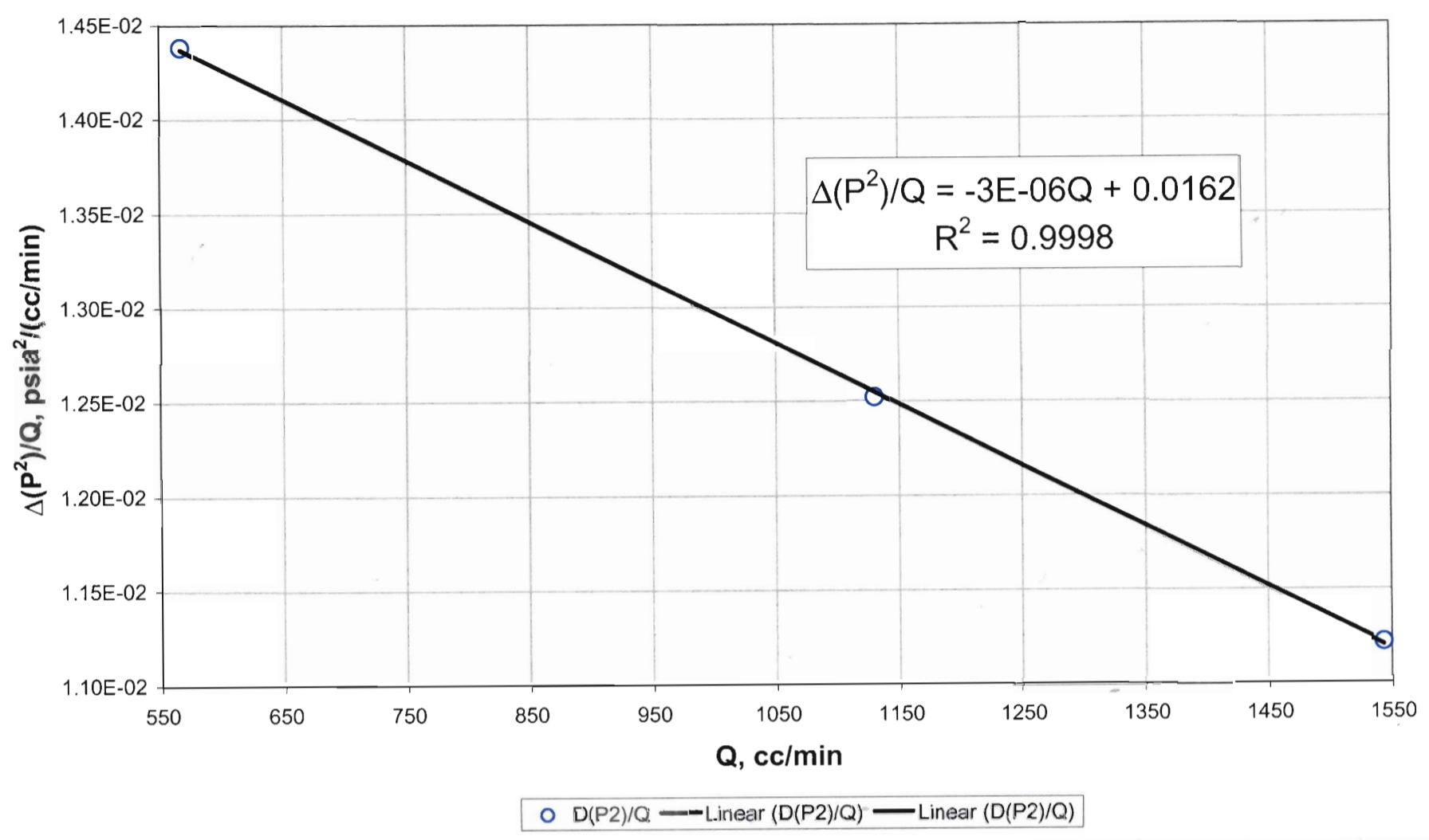
Log-Log plot of differential pressures squared vs. flowrate--used to identify the presence of high-velocity flow effects (when the slope is greater than unity)

V2 Transect: Drillhole 28



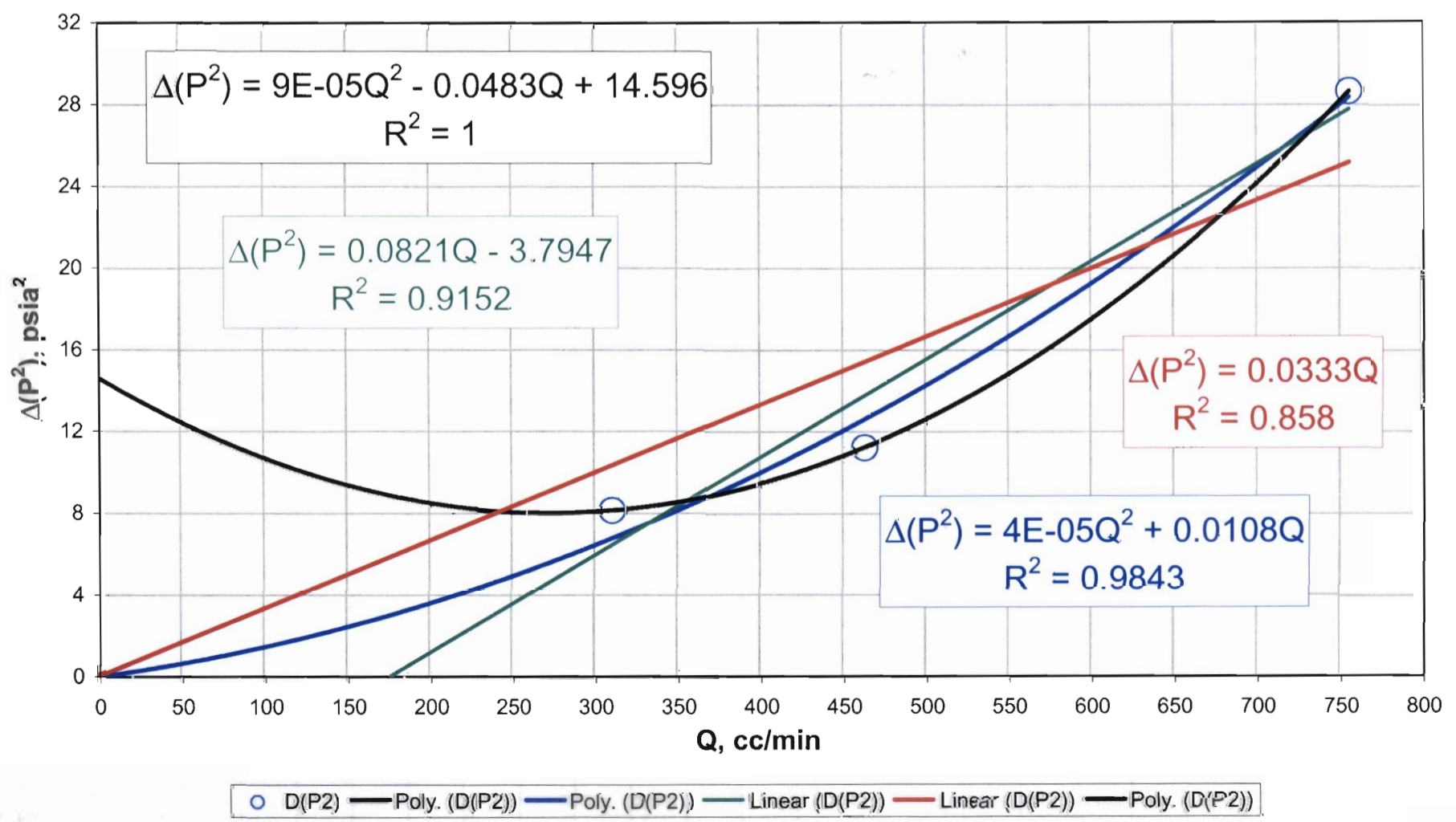
Rmn, 01/28/03

Final check for high velocity flow effects:
 High velocity flow effects are present when the slope is non-zero and positive.
 V2 Transect: Drillhole 28



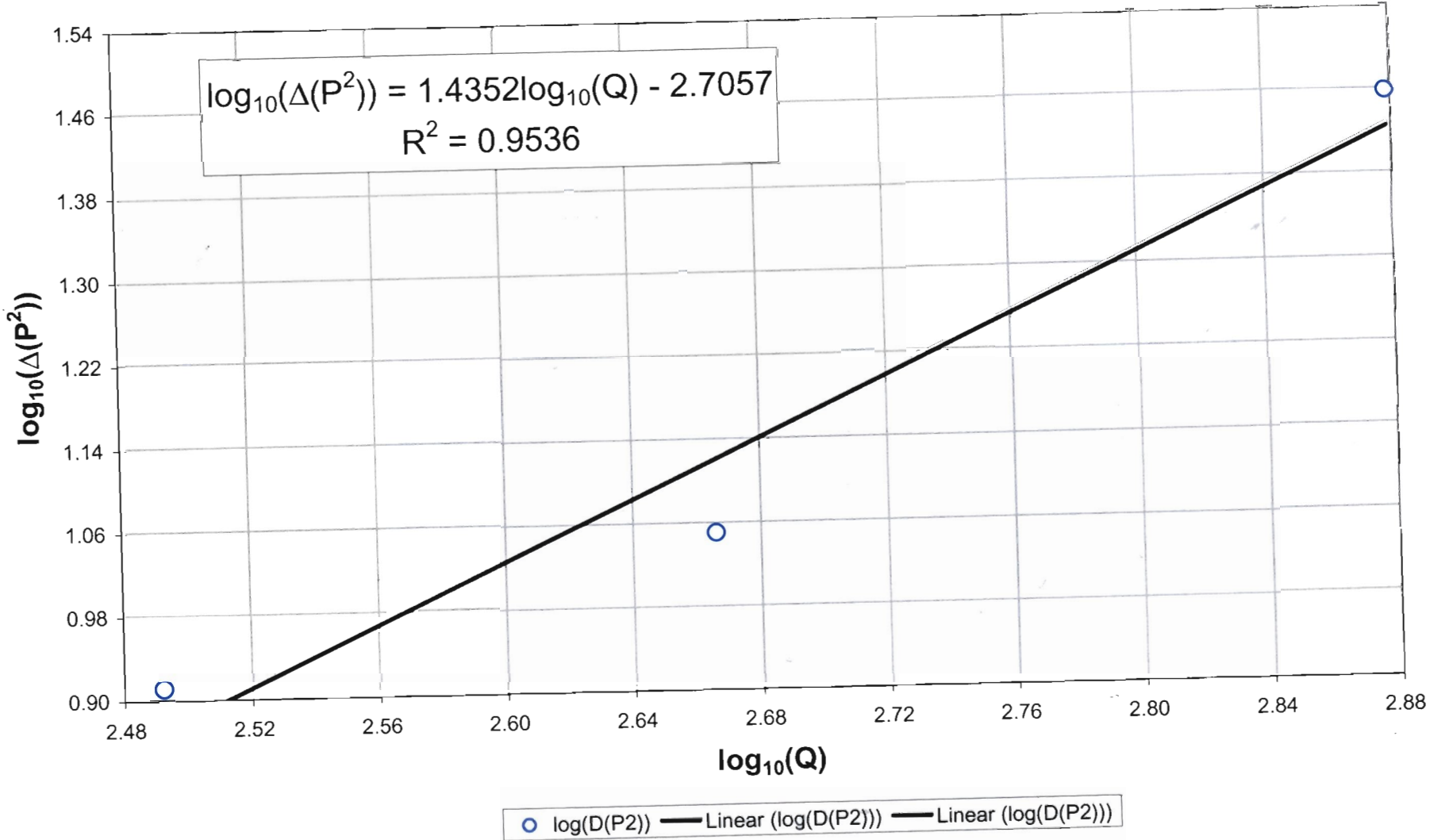
RMV, 01/18/07

Relationship between steady-state differential pressures squared and flowrate:
 If relationship is linear, with the ordinate intercept nearly zero,
 there is no high velocity flow effect.
 V2 Transect: Drillhole 29



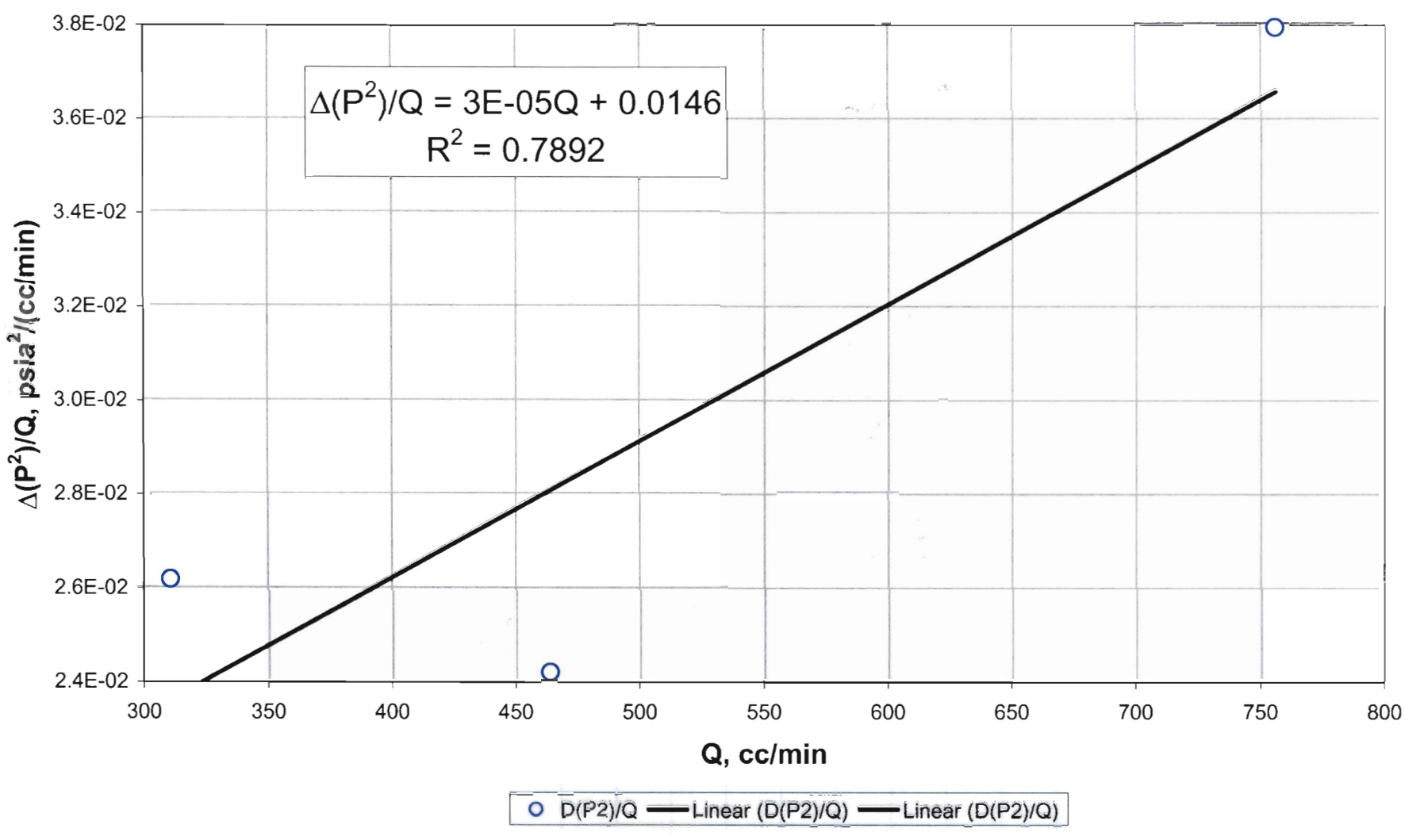
RMV, 01/18/07

Log-Log plot of differential pressures squared vs. flowrate--used to identify the presence of high-velocity flow effects (when the slope is greater than unity)
V2 Transect: Drillhole 29



RMM, 01/28/03

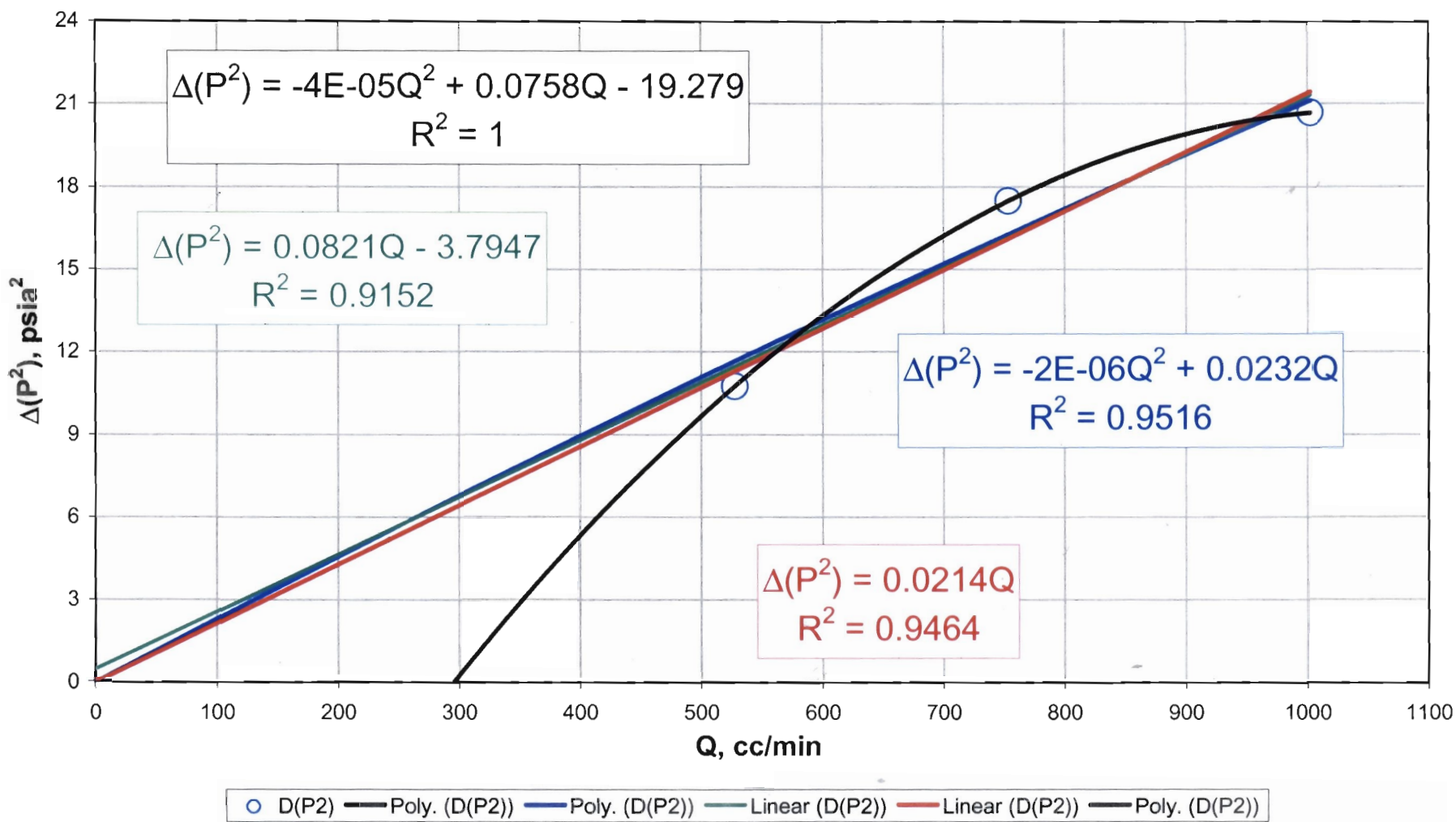
Final check for high velocity flow effects:
High velocity flow effects are present when the slope is non-zero and positive.
V2 Transect: Drillhole 29



RMM, 01/28/03

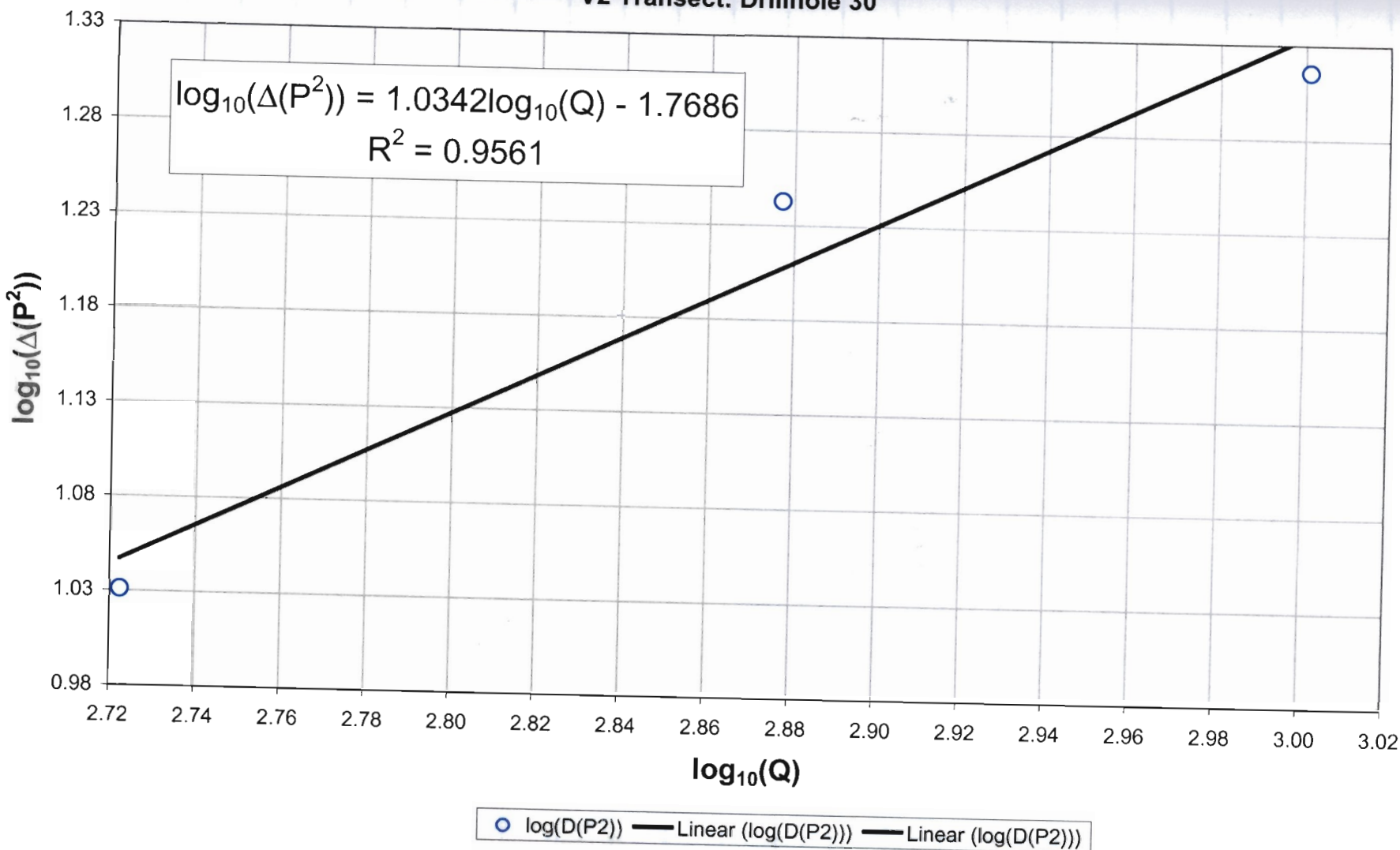
Relationship between steady-state differential pressures squared and flowrate:
 If relationship is linear, with the ordinate intercept nearly zero,
 there is no high velocity flow effect.
 V2 Transect: Drillhole 30

RNM, 01/28/03

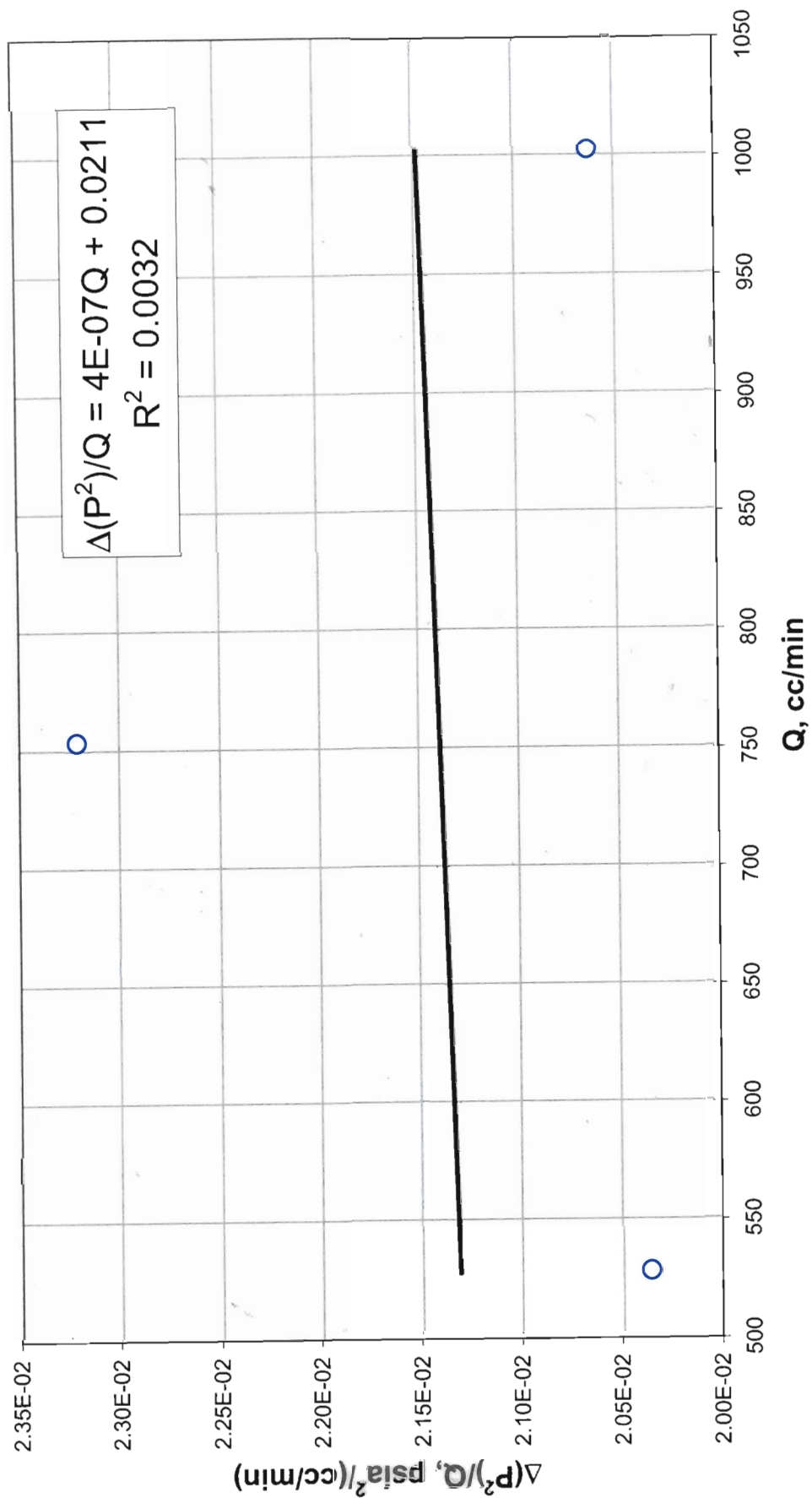


Log-Log plot of differential pressures squared vs. flowrate--used to identify the presence of high-velocity flow effects (when the slope is greater than unity)
 V2 Transect: Drillhole 30

RNM, 01/28/03



Final check for high velocity flow effects:
High velocity flow effects are present when the slope is non-zero and positive.
V2 Transect: Drillhole 30



RNM, 01/28/03

Sample Name	Field	Well	Depth	Diameter	Length	Operator				
permeability measurement (top)	Escalante, UT	#-4 hole	4"	5/8"	4"	robert bridges				
Outside Diam. (in)	Inside Diam. (in)	Geom. Fact.	Ref. Temp. (C)	Viscosity (cp)						
0.92	0.92	7.211	23.0	0.01761						
Date	Time	Flow Press (psia)	Atm. Press (psia)	Flow Rate (cc/min)	Temp. (C)	old Perm. (md)	new Perm. (md)	Sample	Reading	
7/6/00	11:45:08 AM	11.826	11.426	187.2	30.73	363.4117842	325.5424	V3.-4	1	
7/6/00	11:47:28 AM	12.166	11.426	486.1	30.87	503.1317645	465.4094	V3.-4	2	
7/6/00	11:49:25 AM	13.066	11.426	706.8	30.99	318.3479062	317.1131	V3.-4	3	
permeability measurement (top)	Escalante, UT	#-3 hole	4"	5/8"	4"	robert bridges				
Outside Diam. (in)	Inside Diam. (in)	Geom. Fact.	Ref. Temp. (C)	Viscosity (cp)						
0.92	0.92	7.211	23.0	0.01761						
Date	Time	Flow Press (psia)	Atm. Press (psia)	Flow Rate (cc/min)	Temp. (C)	old Perm. (md)	new Perm. (md)	Sample	Reading	
7/6/00	11:37:21 AM	13.636	11.426	730.4	30.28	238.1328389	242.3356	V3.-3	1	
7/6/00	11:39:19 AM	12.376	11.426	452.2	30.42	360.8995668	335.0847	V3.-3	2	
7/6/00	11:41:22 AM	11.996	11.426	199.4	30.55	269.5580654	243.6103	V3.-3	3	
permeability measurement (top)	Escalante, UT	#-2 hole	4"	5/8"	4"	robert bridges				
Outside Diam. (in)	Inside Diam. (in)	Geom. Fact.	Ref. Temp. (C)	Viscosity (cp)						
0.92	0.92	7.211	22.5	0.01759						
Date	Time	Flow Press (psia)	Atm. Press (psia)	Flow Rate (cc/min)	Temp. (C)	old Perm. (md)	new Perm. (md)	Sample	Reading	
7/6/00	11:31:27 AM	11.736	11.426	240.5	29.89	600.574881	533.3849	V3.-2	1	
7/6/00	11:33:23 AM	11.936	11.426	478.2	30.02	720.1640857	653.5101	V3.-2	2	
7/6/00	11:34:42 AM	12.606	11.426	734.8	30.12	465.4288181	447.0776	V3.-2	3	
permeability measurement (top)	Escalante, UT	#-1 hole	4"	5/8"	4"	robert bridges				
Outside Diam. (in)	Inside Diam. (in)	Geom. Fact.	Ref. Temp. (C)	Viscosity (cp)						
0.92	0.92	7.211	22.0	0.01757						
Date	Time	Flow Press (psia)	Atm. Press (psia)	Flow Rate (cc/min)	Temp. (C)	old Perm. (md)	new Perm. (md)	Sample	Reading	
7/6/00	11:23:03 AM	14.246	11.426	726.0	29.47	180.2772466	195.4339	V3.-1	1	
7/6/00	11:25:17 AM	12.656	11.426	447.8	29.55	271.4794185	262.4457	V3.-1	2	
7/6/00	11:27:10 AM	12.186	11.426	200.3	29.64	200.4143472	187.1428	V3.-1	3	

RNM, 01/28/03

Sample Name	Field	Well	Depth	Diameter	Length	Operator			
permeability measurement (top)	Escalante, UT	#0 hole	4"	5/8"	4"	robert bridges			
Outside Diam.	Inside Diam.	Geom. Fact.	Ref. Temp.	Viscosity					
(in)	(in)		(C)	(cp)					
0.92	0.92	7.211	21.5	0.01755					
Date	Time	Flow Press	Atm. Press	Flow Rate	Temp.	old Perm.	new Perm.	Sample	Reading
		(psia)	(psia)	(cc/min)	(C)	(md)	(md)		
7/6/00	11:16:29 AM	11.886	11.426	179.9	29.33	301.3404486	277.4661	V3.0	1
7/6/00	11:17:51 AM	12.276	11.426	482.3	29.36	430.2078835	409.3499	V3.0	2
7/6/00	11:19:12 AM	13.266	11.426	724.0	29.41	286.6691211	294.9633	V3.0	3

Sample Name	Field	Well	Depth	Diameter	Length	Operator			
permeability measurement (top)	Escalante, UT	#1 hole	4"	5/8"	4"	robert bridges			
Outside Diam.	Inside Diam.	Geom. Fact.	Ref. Temp.	Viscosity					
(in)	(in)		(C)	(cp)					
0.92	0.92	7.211	21.0	0.01753					
Date	Time	Flow Press	Atm. Press	Flow Rate	Temp.	old Perm.	new Perm.	Sample	Reading
		(psia)	(psia)	(cc/min)	(C)	(md)	(md)		
7/6/00	11:08:35 AM	14.706	11.426	726.8	29.30	152.9206557	177.2567	V3.1	1
7/6/00	11:10:21 AM	12.976	11.426	482.2	29.33	229.6156832	235.3937	V3.1	2
7/6/00	11:12:43 AM	12.316	11.426	192.2	29.33	163.7276087	159.4042	V3.1	3

Sample Name	Field	Well	Depth	Diameter	Length	Operator			
permeability measurement (top)	Escalante, UT	#2 hole	4"	5/8"	4"	robert bridges			
Outside Diam.	Inside Diam.	Geom. Fact.	Ref. Temp.	Viscosity					
(in)	(in)		(C)	(cp)					
0.92	0.92	7.211	20.5	0.01751					
Date	Time	Flow Press	Atm. Press	Flow Rate	Temp.	old Perm.	new Perm.	Sample	Reading
		(psia)	(psia)	(cc/min)	(C)	(md)	(md)		
7/6/00	11:02:39 AM	12.666	11.426	180.3	28.92	108.7086682	109.7387	V3.2	1
7/6/00	11:03:59 AM	13.586	11.426	470.3	29.07	156.9980	170.6595	V3.2	2
7/6/00	11:05:20 AM	16.006	11.426	728.8	29.23	104.8647654	134.7156	V3.2	3

Sample Name	Field	Well	Depth	Diameter	Length	Operator			
permeability measurement (top)	Escalante, UT	#3 hole	4"	5/8"	4"	robert bridges			
Outside Diam.	Inside Diam.	Geom. Fact.	Ref. Temp.	Viscosity					
(in)	(in)		(C)	(cp)					
0.92	0.92	7.211	19.5	0.01746					
Date	Time	Flow Press	Atm. Press	Flow Rate	Temp.	old Perm.	new Perm.	Sample	Reading
		(psia)	(psia)	(cc/min)	(C)	(md)	(md)		
7/6/00	10:55:33 AM	14.256	11.426	674.8	27.48	167.2267396	189.3562	V3.3	1
7/6/00	10:56:57 AM	12.786	11.426	427.8	27.68	233.8703969	239.3742	V3.3	2
7/6/00	10:58:46 AM	12.276	11.426	186.5	28.05	166.7683617	165.9472	V3.3	3

RNM, 01/28/03

Sample Name	Field	Well	Depth	Diameter	Length	Operator			
permeability measurement (top)	Escalante, UT	#4 hole	4"	5/8"	4"	robert bridges			
Outside Diam.	Inside Diam.	Geom. Fact.	Ref. Temp.	Viscosity					
(in)	(in)		(C)	(cp)					
0.92	0.92	7.211	19.0	0.01744					
Date	Time	Flow Press	Atm. Press	Flow Rate	Temp.	old Perm.	new Perm.	Sample	Reading
		(psia)	(psia)	(cc/min)	(C)	(md)	(md)		
7/6/00	10:48:09 AM	11.916	11.426	192.1	24.01	298.924486	256.4387	V3.4	1
7/6/00	10:50:01 AM	12.306	11.426	496.4	25.21	424.905214	393.5249	V3.4	2
7/6/00	10:51:22 AM	13.116	11.426	691.6	26.14	299.226456	305.0935	V3.4	3

Sample Name	Field	Well	Depth	Diameter	Length	Operator			
permeability measurement (top)	Escalante, UT	#5 hole	4"	5/8"	4"	robert bridges			
Outside Diam.	Inside Diam.	Geom. Fact.	Ref. Temp.	Viscosity					
(in)	(in)		(C)	(cp)					
0.92	0.92	7.211	19.0	0.01744					
Date	Time	Flow Press	Atm. Press	Flow Rate	Temp.	old Perm.	new Perm.	Sample	Reading
		(psia)	(psia)	(cc/min)	(C)	(md)	(md)		
7/6/00	10:38:56 AM	13.026	11.426	685.2	22.50	310.4373563	273.9329	V3.5	1
7/6/00	10:40:32 AM	12.266	11.426	482.4	22.61	429.5211455	358.7546	V3.5	2
7/6/00	10:42:11 AM	11.916	11.426	198.0	22.72	306.767214	250.1137	V3.5	3

Sample Name	Field	Well	Depth	Diameter	Length	Operator			
permeability measurement (top)	Escalante, UT	#6 hole	4"	5/8"	4"	robert bridges			
Outside Diam.	Inside Diam.	Geom. Fact.	Ref. Temp.	Viscosity					
(in)	(in)		(C)	(cp)					
0.92	0.92	7.211	19.0	0.01744					
Date	Time	Flow Press	Atm. Press	Flow Rate	Temp.	old Perm.	new Perm.	Sample	Reading
		(psia)	(psia)	(cc/min)	(C)	(md)	(md)		
7/6/00	10:29:34 AM	11.916	11.426	196.8	22.08	304.248134	241.5951	V3.6	1
7/6/00	10:30:45 AM	12.206	11.426	454.0	22.12	435.686914	354.8844	V3.6	2
7/6/00	10:31:53 AM	12.956	11.426	687.2	22.18	326.1493177	282.5027	V3.6	3

Sample Name	Field	Well	Depth	Diameter	Length	Operator			
permeability measurement (top)	Escalante, UT	#7 hole	4"	5/8"	4"	robert bridges			
Outside Diam.	Inside Diam.	Geom. Fact.	Ref. Temp.	Viscosity					
(in)	(in)		(C)	(cp)					
0.92	0.92	7.211	18.5	0.01742					
Date	Time	Flow Press	Atm. Press	Flow Rate	Temp.	old Perm.	new Perm.	Sample	Reading
		(psia)	(psia)	(cc/min)	(C)	(md)	(md)		
7/6/00	10:23:10 AM	13.946	11.426	730.4	21.87	201.3993641	190.7367	V3.7	1
7/6/00	10:25:16 AM	12.596	11.426	444.7	21.93	278.6863949	239.2619	V3.7	2
7/6/00	10:26:33 AM	12.186	11.426	202.1	21.96	198.3104616	164.9847	V3.7	3

RNM, 01/28/03

Sample Name	Field	Well	Depth	Diameter	Length	Operator			
permeability measurement (top)	Escalante, UT	#8 hole	4"	5/8"	4"	robert bridges			
Outside Diam.	Inside Diam.	Geom. Fact.	Ref. Temp.	Viscosity					
(in)	(in)		(C)	(cp)					
0.92	0.92	7.211	18.5	0.01742					
Date	Time	Flow Press	Atm. Press	Flow Rate	Temp.	old Perm.	new Perm.	Sample	Reading
		(psia)	(psia)	(cc/min)	(C)	(md)	(md)		
7/6/00	10:16:21 AM	12.036	11.426	193.9	21.68	238.30625	193.5328	V3.8	1
7/6/00	10:18:17 AM	12.486	11.426	488.3	21.75	339.0787056	286.4031	V3.8	2
7/6/00	10:19:38 AM	13.506	11.426	725.2	21.78	246.3775437	225.1916	V3.8	3
Sample Name	Field	Well	Depth	Diameter	Length	Operator			
permeability measurement (top)	Escalante, UT	#9 hole	4"	5/8"	4"	robert bridges			
Outside Diam.	Inside Diam.	Geom. Fact.	Ref. Temp.	Viscosity					
(in)	(in)		(C)	(cp)					
0.92	0.92	7.211	18.0	0.01740					
Date	Time	Flow Press	Atm. Press	Flow Rate	Temp.	old Perm.	new Perm.	Sample	Reading
		(psia)	(psia)	(cc/min)	(C)	(md)	(md)		
7/6/00	10:10:12 AM	12.966	11.426	714.8	21.48	335.3391082	297.8283	V3.9	1
7/6/00	10:11:26 AM	12.216	11.426	487.5	21.52	459.7251738	385.6061	V3.9	2
7/6/00	10:13:26 AM	11.886	11.426	199.1	21.56	326.9592014	267.3792	V3.9	3
Sample Name	Field	Well	Depth	Diameter	Length	Operator			
permeability measurement (top)	Escalante, UT	#10 hole	4"	5/8"	4"	robert bridges			
Outside Diam.	Inside Diam.	Geom. Fact.	Ref. Temp.	Viscosity					
(in)	(in)		(C)	(cp)					
0.92	0.92	7.211	18.0	0.01740					
Date	Time	Flow Press	Atm. Press	Flow Rate	Temp.	old Perm.	new Perm.	Sample	Reading
		(psia)	(psia)	(cc/min)	(C)	(md)	(md)		
7/6/00	10:04:12 AM	11.926	11.426	200.3	21.28	301.8213695	244.6598	V3.10	1
7/6/00	10:05:18 AM	12.346	11.426	497.6	21.30	400.4876687	336.2343	V3.10	2
7/6/00	10:06:30 AM	13.026	11.426	704.0	21.36	316.9944454	281.3584	V3.10	3
Sample Name	Field	Well	Depth	Diameter	Length	Operator			
permeability measurement (top)	Escalante, UT	#11 hole	4"	5/8"	4"	robert bridges			
Outside Diam.	Inside Diam.	Geom. Fact.	Ref. Temp.	Viscosity					
(in)	(in)		(C)	(cp)					
0.92	0.92	7.211	18.0	0.01740					
Date	Time	Flow Press	Atm. Press	Flow Rate	Temp.	old Perm.	new Perm.	Sample	Reading
		(psia)	(psia)	(cc/min)	(C)	(md)	(md)		
7/6/00	9:56:16 AM	13.281	11.431	686.4	20.92	264.2591602	234.4226	V3.11	1
7/6/00	9:57:52 AM	12.431	11.431	485.7	20.98	358.0674169	298.3198	V3.11	2
7/6/00	9:59:52 AM	12.041	11.431	205.5	21.05	252.4559103	204.4353	V3.11	3

RNM, 01/28/03

Sample Name	Field	Well	Depth	Diameter	Length	Operator			
permeability measurement (top)	Escalante, UT	#12 hole	4"	5/8"	4"	robert bridges			
Outside Diam.	Inside Diam.	Geom. Fact.	Ref. Temp.	Viscosity					
(in)	(in)		(C)	(cp)					
0.92	0.92	7.211	18.0	0.01740					
Date	Time	Flow Press	Atm. Press	Flow Rate	Temp.	old Perm.	new Perm.	Sample	Reading
		(psia)	(psia)	(cc/min)	(C)	(md)	(md)		
7/6/00	9:50:12 AM	12.171	11.431	202.1	20.58	203.2340	162.8796	V3.12	1
7/6/00	9:50:58 AM	12.711	11.431	493.1	20.61	280.4241546	234.9194	V3.12	2
7/6/00	9:52:08 AM	13.721	11.431	691.6	20.68	211.2421702	191.4664	V3.12	3
Sample Name	Field	Well	Depth	Diameter	Length	Operator			
permeability measurement (top)	Escalante, UT	#13 hole	4"	5/8"	4"	robert bridges			
Outside Diam.	Inside Diam.	Geom. Fact.	Ref. Temp.	Viscosity					
(in)	(in)		(C)	(cp)					
0.92	0.92	7.211	18.0	0.01740					
Date	Time	Flow Press	Atm. Press	Flow Rate	Temp.	old Perm.	new Perm.	Sample	Reading
		(psia)	(psia)	(cc/min)	(C)	(md)	(md)		
7/6/00	9:37:52 AM	12.541	11.431	704.8	19.56	463.7476206	365.1312	V3.13	1
7/6/00	9:38:52 AM	12.061	11.431	490.5	19.66	580.2060941	441.6260	V3.13	2
7/6/00	9:43:03 AM	11.781	11.431	207.1	20.04	446.7390	338.2117	V3.13	3
Sample Name	Field	Well	Depth	Diameter	Length	Operator			
permeability measurement (top)	Escalante, UT	#14 hole	4"	5/8"	4"	robert bridges			
Outside Diam.	Inside Diam.	Geom. Fact.	Ref. Temp.	Viscosity					
(in)	(in)		(C)	(cp)					
0.92	0.92	7.211	17.5	0.01738					
Date	Time	Flow Press	Atm. Press	Flow Rate	Temp.	old Perm.	new Perm.	Sample	Reading
		(psia)	(psia)	(cc/min)	(C)	(md)	(md)		
7/6/00		11.741	11.431	480.0	18.50	1167.0000	837.9455	V3.14	1
7/6/00	9:29:32 AM	11.911	11.431	717.2	18.67	1118.6129	821.8195	V3.14	2
7/6/00	9:32:33 AM	12.141	11.431	1000.8	19.03	1046.4996	797.6433	V3.14	3
Sample Name	Field	Well	Depth	Diameter	Length	Operator			
permeability measurement (top)	Escalante, UT	#15 hole	4"	5/8"	4"	robert bridges			
Outside Diam.	Inside Diam.	Geom. Fact.	Ref. Temp.	Viscosity					
(in)	(in)		(C)	(cp)					
0.92	0.92	7.211	26.5	0.01776					
Date	Time	Flow Press	Atm. Press	Flow Rate	Temp.	old Perm.	new Perm.	Sample	Reading
		(psia)	(psia)	(cc/min)	(C)	(md)	(md)		
7/5/00	4:25:00 PM	14.561	11.391	727	31.7	160	158.8664	V3.15	1
7/5/00	4:25:00 PM	12.791	11.391	480	31.7	256	223.9041	V3.15	2
7/5/00	4:25:00 PM	12.101	11.391	172	31.7	186	154.0664	V3.15	3

RNM, 01/28/03

Sample Name	Field	Well	Depth	Diameter	Length	Operator				
permeability measurement (top)	Escalante, UT	#16 hole	4"	5/8"	4"	robert bridges				
Outside Diam.	Inside Diam.	Geom. Fact.	Ref. Temp.	Viscosity						
(in)	(in)		(C)	(cp)						
0.92	0.92	7.211	26.5	0.01776						
Date	Time	Flow Press	Atm. Press	Flow Rate	Temp.	old Perm.	new Perm.	Sample	Reading	
		(psia)	(psia)	(cc/min)	(C)	(md)	(md)			
7/5/00	4:21:10 PM	16.141	11.391	216.4	31.60	29.9780	32.8716	V3.16	1	
7/5/00	4:22:06 PM	18.991	11.391	482.2	31.63	37.9127	48.8564	V3.16	2	
7/5/00	4:23:21 PM	26.191	11.391	725.2	31.67	23.7613	42.1205	V3.16	3	

Sample Name	Field	Well	Depth	Diameter	Length	Operator				
permeability measurement (top)	Escalante, UT	#17 hole	4"	5/8"	4"	robert bridges				
Outside Diam.	Inside Diam.	Geom. Fact.	Ref. Temp.	Viscosity						
(in)	(in)		(C)	(cp)						
0.92	0.92	7.211	26.5	0.01776						
Date	Time	Flow Press	Atm. Press	Flow Rate	Temp.	old Perm.	new Perm.	Sample	Reading	
		(psia)	(psia)	(cc/min)	(C)	(md)	(md)			
7/5/00	4:13:07 PM	14.441	11.391	697.2	31.40	159.9869488	156.2801	V3.17	1	
7/5/00	4:15:30 PM	12.791	11.391	463.1	31.46	246.9762648	214.3853	V3.17	2	
7/5/00	4:17:25 PM	12.171	11.391	195.5	31.50	191.9650	158.8379	V3.17	3	

Sample Name	Field	Well	Depth	Diameter	Length	Operator				
permeability measurement (top)	Escalante, UT	#18 hole	4"	5/8"	4"	robert bridges				
Outside Diam.	Inside Diam.	Geom. Fact.	Ref. Temp.	Viscosity						
(in)	(in)		(C)	(cp)						
0.92	0.92	7.211	26.5	0.01776						
Date	Time	Flow Press	Atm. Press	Flow Rate	Temp.	old Perm.	new Perm.	Sample	Reading	
		(psia)	(psia)	(cc/min)	(C)	(md)	(md)			
7/5/00	4:04:13 PM	11.691	11.391	390.6	31.32	1016.8088	804.4301	V3.18	1	
7/5/00	4:05:50 PM	11.801	11.391	498.0	31.29	944.1315881	753.1977	V3.18	2	
7/5/00	4:07:55 PM	12.461	11.391	741.2	31.33	523.9587137	441.5882	V3.18	3	
7/5/00	4:09:53 PM	12.691	11.391	1077.6	31.41	621.349645	534.3955	V3.18	4	

Sample Name	Field	Well	Depth	Diameter	Length	Operator				
permeability measurement (top)	Escalante, UT	#19 hole	4"	5/8"	4"	robert bridges				
Outside Diam.	Inside Diam.	Geom. Fact.	Ref. Temp.	Viscosity						
(in)	(in)		(C)	(cp)						
0.92	0.92	7.211	25.5	0.01771						
Date	Time	Flow Press	Atm. Press	Flow Rate	Temp.	old Perm.	new Perm.	Sample	Reading	
		(psia)	(psia)	(cc/min)	(C)	(md)	(md)			
7/5/00	3:52:10 PM	12.551	11.401	1524.4	30.90	995.6794386	866.6858	V3.19	1	
7/5/00	3:54:27 PM	12.311	11.401	1025.6	30.95	855.0599005	731.2872	V3.19	2	
7/5/00	3:56:19 PM	12.101	11.401	680.8	31.00	744.4300	626.8523	V3.19	3	
7/5/00	3:58:40 PM	11.701	11.401	465.3	31.09	1207.5845	986.2147	V3.19	4	

RPM, 01/08/03

Sample Name	Field	Well	Depth	Diameter	Length	Operator				
permeability measurement (top)	Escalante, UT	#20 hole	4"	5/8"	4"	robert bridges				
Outside Diam.	Inside Diam.	Geom. Fact.	Ref. Temp.	Viscosity						
(in)	(in)		(C)	(cp)						
0.92	0.92	7.211	25.5	0.01771						
Date	Time	Flow Press	Atm. Press	Flow Rate	Temp.	old Perm.	new Perm.	Sample	Reading	
		(psia)	(psia)	(cc/min)	(C)	(md)	(md)			
7/5/00	3:34:31 PM	11.791	11.401	505.2	31.15	1004.8798	828.3899	V3.20	1	
7/5/00	3:36:44 PM	12.051	11.401	732.4	31.00	864.2513745	724.7787	V3.20	2	
7/5/00	3:40:56 PM	12.181	11.401	1033.6	30.97	1010.8273	855.9866	V3.20	3	
7/5/00	3:42:38 PM	12.371	11.401	1486.8	30.93	1159.9538	996.2432	V3.20	4	

Sample Name	Field	Well	Depth	Diameter	Length	Operator				
permeability measurement (top)	Escalante, UT	#21 hole	4"	5/8"	4"	robert bridges				
Outside Diam.	Inside Diam.	Geom. Fact.	Ref. Temp.	Viscosity						
(in)	(in)		(C)	(cp)						
0.92	0.92	7.211	25.0	0.01769						
Date	Time	Flow Press	Atm. Press	Flow Rate	Temp.	old Perm.	new Perm.	Sample	Reading	
		(psia)	(psia)	(cc/min)	(C)	(md)	(md)			
7/5/00	3:22:00 PM	12.421	11.401	1552.0	31.06	1151.5276	1013.7415	V3.21	1	
7/5/00	3:23:39 PM	12.181	11.401	990.8	31.10	971.0112105	839.4793	V3.21	2	
7/5/00	3:26:16 PM	12.081	11.401	730.0	31.09	824.0396388	706.4125	V3.21	3	
7/5/00	3:29:57 PM	11.821	11.401	507.2	31.17	937.3088847	788.2741	V3.21	4	

Sample Name	Field	Well	Depth	Diameter	Length	Operator				
permeability measurement (top)	Escalante, UT	#22 hole	4"	5/8"	4"	robert bridges				
Outside Diam.	Inside Diam.	Geom. Fact.	Ref. Temp.	Viscosity						
(in)	(in)		(C)	(cp)						
0.92	0.92	7.211	24.5	0.01767						
Date	Time	Flow Press	Atm. Press	Flow Rate	Temp.	old Perm.	new Perm.	Sample	Reading	
		(psia)	(psia)	(cc/min)	(C)	(md)	(md)			
7/5/00	3:09:54 PM	11.751	11.401	705.6	31.00	1571.1188	1330.0189	V3.22	1	
7/5/00	3:13:27 PM	11.831	11.401	1073.2	31.04	1938.7695	1654.2002	V3.22	2	
7/5/00	3:17:28 PM	11.931	11.401	1513.2	30.97	2208.0772	1895.8581	V3.22	3	

Sample Name	Field	Well	Depth	Diameter	Length	Operator				
permeability measurement (top)	Escalante, UT	#23 hole	4"	5/8"	4"	robert bridges				
Outside Diam.	Inside Diam.	Geom. Fact.	Ref. Temp.	Viscosity						
(in)	(in)		(C)	(cp)						
0.92	0.92	7.211	24.5	0.01767						
Date	Time	Flow Press	Atm. Press	Flow Rate	Temp.	old Perm.	new Perm.	Sample	Reading	
		(psia)	(psia)	(cc/min)	(C)	(md)	(md)			
7/5/00	2:46:52 PM	11.851	11.411	1484.8	30.92	2619.2410	2228.8560	V3.23	1	
7/5/00	2:50:08 PM	11.761	11.411	1021.2	30.95	2273.4731	1921.7790	V3.23	2	
7/5/00		11.711	11.411	739.0	31.00	1924.0000	1621.7084	V3.23	3	

RPM, 01/08/03

Sample Name	Field	Well	Depth	Diameter	Length	Operator					
permeability measurement (top)	Escalante, UT	#24 hole	4"	5/8"	4"	robert bridges					
Outside Diam.	Inside Diam.	Geom. Fact.	Ref. Temp.	Viscosity							
(in)	(in)		(C)	(cp)							
0.92	0.92	7.211	24.5	0.01767							
Date	Time	Flow Press	Atm. Press	Flow Rate	Temp.	old Perm.	new Perm.	Sample	Reading		
		(psia)	(psia)	(cc/min)	(C)	(md)	(md)				
7/5/00	2:23:49 PM	11.741	11.411	714.0	31.12	1688.2640	1431.7254	V3.24	1		
7/5/00	2:30:59 PM	11.821	11.411	1034.4	30.93	1960.7690	1664.8361	V3.24	2		
7/5/00	2:39:50 PM	11.911	11.411	1479.2	30.90	2290.3187	1957.5691	V3.24	3		

Sample Name	Field	Well	Depth	Diameter	Length	Operator					
permeability measurement (top)	Escalante, UT	#25 hole	4"	5/8"	4"	robert bridges					
Outside Diam.	Inside Diam.	Geom. Fact.	Ref. Temp.	Viscosity							
(in)	(in)		(C)	(cp)							
0.92	0.92	7.211	24.0	0.01765							
Date	Time	Flow Press	Atm. Press	Flow Rate	Temp.	old Perm.	new Perm.	Sample	Reading		
		(psia)	(psia)	(cc/min)	(C)	(md)	(md)				
7/5/00	2:05:52 PM	12.191	11.411	1522	31.23	1497.2638	1345.6913	V3.25	1		
7/5/00	2:08:44 PM	12.021	11.411	1048.8	31.27	1306.8389	1179.1928	V3.25	2		
7/5/00	2:13:26 PM	11.951	11.411	785.6	31.29	1127.7359	995.5667	V3.25	3		
7/5/00	2:16:47 PM	11.721	11.411	502.8	31.3	1269.5320	1099.7457	V3.25	4		

Sample Name	Field	Well	Depth	Diameter	Length	Operator					
permeability measurement (top)	Escalante, UT	#26 hole	4"	5/8"	4"	robert bridges					
Outside Diam.	Inside Diam.	Geom. Fact.	Ref. Temp.	Viscosity							
(in)	(in)		(C)	(cp)							
0.92	0.92	7.211	24.0	0.01765							
Date	Time	Flow Press	Atm. Press	Flow Rate	Temp.	old Perm.	new Perm.	Sample	Reading		
		(psia)	(psia)	(cc/min)	(C)	(md)	(md)				
7/5/00	1:46:58 PM	11.731	11.411	540.4	31.07	1320.2731	1094.1999	V3.26	1		
7/5/00	1:51:13 PM	11.921	11.411	748.8	31.10	1138.8568	959.7822	V3.26	2		
7/5/00	1:52:52 PM	12.021	11.411	1090.4	31.15	1380.9780	1175.1714	V3.26	3		
7/5/00	1:55:49 PM	12.141	11.411	1468.4	31.15	1546.2699	1328.8077	V3.26	4		

Sample Name	Field	Well	Depth	Diameter	Length	Operator					
permeability measurement (top)	Escalante, UT	#27 hole	4"	5/8"	4"	robert bridges					
Outside Diam.	Inside Diam.	Geom. Fact.	Ref. Temp.	Viscosity							
(in)	(in)		(C)	(cp)							
0.92	0.92	7.211	24.0	0.01765							
Date	Time	Flow Press	Atm. Press	Flow Rate	Temp.	old Perm.	new Perm.	Sample	Reading		
		(psia)	(psia)	(cc/min)	(C)	(md)	(md)				
7/5/00	1:34:16 PM	12.151	11.411	1504.8	30.72	1560.3295	1350.7888	V3.27	1		
7/5/00	1:37:34 PM	12.011	11.411	1037.2	30.86	1334.7772	1147.0482	V3.27	2		
7/5/00	1:38:52 PM	11.861	11.411	678.4	30.89	1171.4908	995.1719	V3.27	3		
7/5/00	1:40:50 PM	11.721	11.411	520.8	30.95	1313.4681	1104.6907	V3.27	4		

Run, 01/28/03

Sample Name	Field	Well	Depth	Diameter	Length	Operator					
permeability measurement (top)	Escalante, UT	#28 hole	4"	5/8"	4"	robert bridges					
Outside Diam.	Inside Diam.	Geom. Fact.	Ref. Temp.	Viscosity							
(in)	(in)		(C)	(cp)							
0.92	0.92	7.211	24.0	0.01765							
Date	Time	Flow Press	Atm. Press	Flow Rate	Temp.	old Perm.	new Perm.	Sample	Reading		
		(psia)	(psia)	(cc/min)	(C)	(md)	(md)				
7/5/00	1:21:43 PM	11.741	11.411	723.6	30.53	1710.5188	1423.4666	V3.28	1		
7/5/00	1:24:35 PM	11.821	11.411	1047.6	30.61	1987.0392	1668.6370	V3.28	2		
7/5/00	1:28:21 PM	11.901	11.411	1454.8	30.63	2301.2969	1946.6032	V3.28	3		

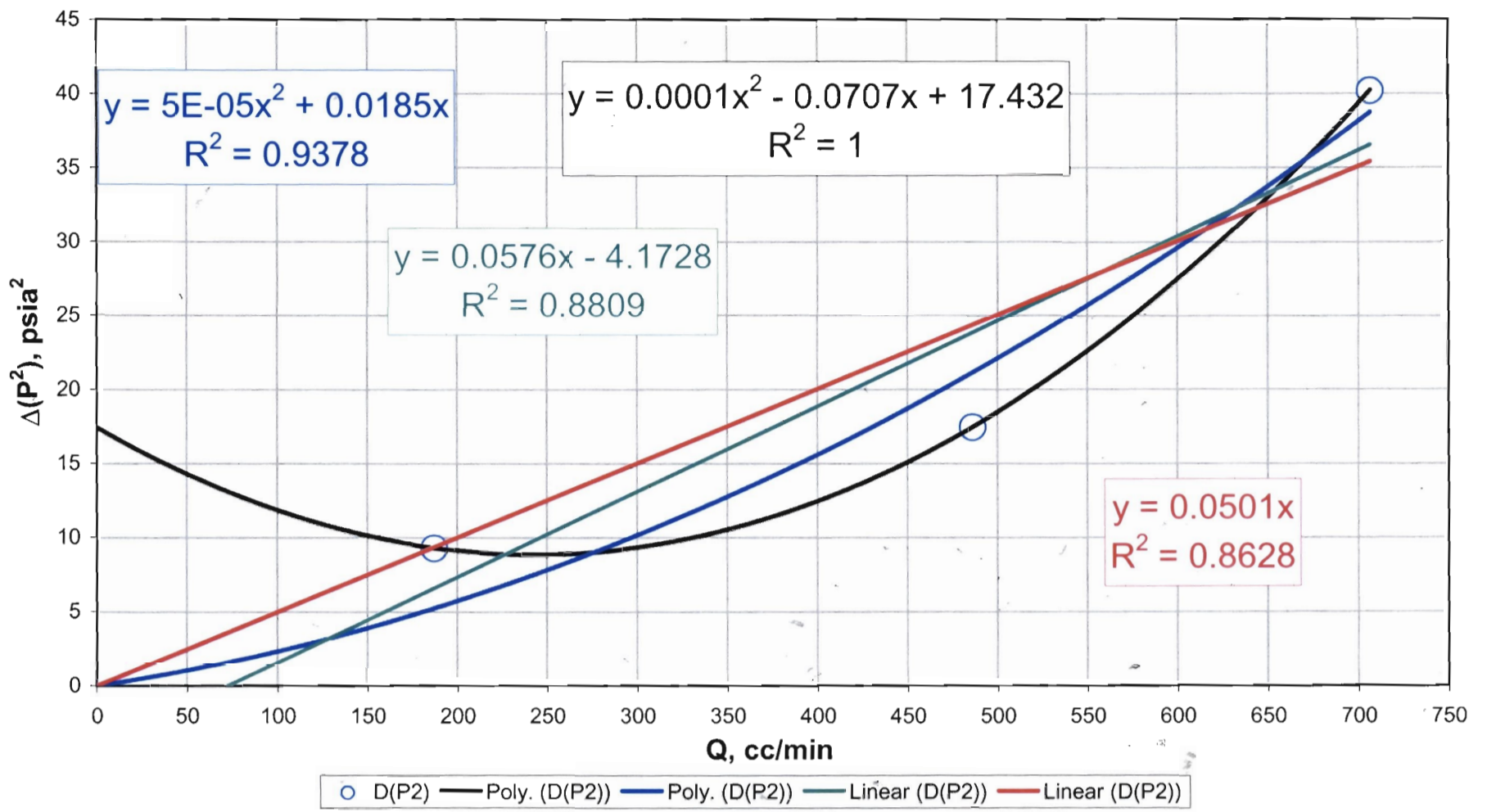
Sample Name	Field	Well	Depth	Diameter	Length	Operator					
permeability measurement (top)	Escalante, UT	#29 hole	4"	5/8"	4"	robert bridges					
Outside Diam.	Inside Diam.	Geom. Fact.	Ref. Temp.	Viscosity							
(in)	(in)		(C)	(cp)							
0.92	0.92	7.211	24.0	0.01765							
Date	Time	Flow Press	Atm. Press	Flow Rate	Temp.	old Perm.	new Perm.	Sample	Reading		
		(psia)	(psia)	(cc/min)	(C)	(md)	(md)				
7/5/00	1:07:02 PM	11.761	11.411	555.6	29.27	1232.1531	988.8193	V3.29	1		
7/5/00	1:09:05 PM	11.891	11.411	704.8	29.57	1134.6274	929.0101	V3.29	2		
7/5/00	1:11:46 PM	12.061	11.411	992.4	29.9	1172.7139	983.5515	V3.29	3		
7/5/00	1:15:18 PM	12.211	11.411	1442.8	30.29	1378.4503	1184.0479	V3.29	4		

Sample Name	Field	Well	Depth	Diameter	Length	Operator					
permeability measurement (top)	Escalante, UT	#30 hole	4"	5/8"	4"	robert bridges					
Outside Diam.	Inside Diam.	Geom. Fact.	Ref. Temp.	Viscosity							
(in)	(in)		(C)	(cp)							
0.92	0.92	7.211	24.5	0.01767							
Date	Time	Flow Press	Atm. Press	Flow Rate	Temp.	old Perm.	new Perm.	Sample	Reading		
		(psia)	(psia)	(cc/min)	(C)	(md)	(md)				
7/5/00	12:49:26 PM	11.726	11.416	315.9	26.52	783.7748994	585.4278	V3.30	1		
7/5/00	12:52:36 PM	11.796	11.416	438.1	26.98	885.4788117	675.7976	V3.30	2		
7/5/00	12:54:10 PM	12.246	11.416	674.0	27.28	612.7115603	490.1532	V3.30	3		
7/5/00	12:58:48 PM	12.996	11.416	1396.8	28.23	649.0429438	568.0116	V3.30	4		

Run, 01/28/03

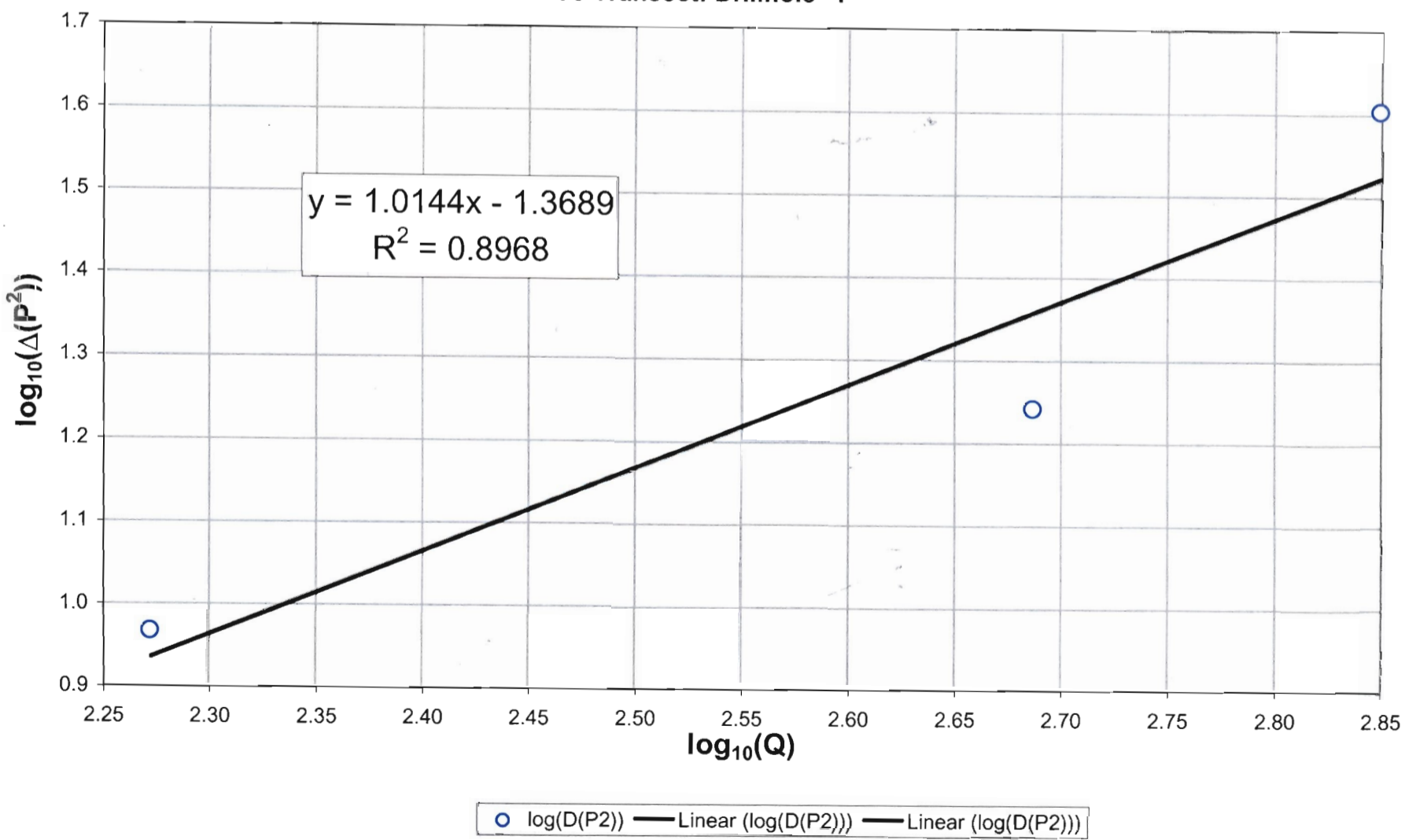
Relationship between steady-state differential pressures squared and flowrate:
 If relationship is linear, with the ordinate intercept nearly zero,
 there is no high velocity flow effect.
 V3 Transect: Drillhole -4

Rmn, 01/29/03

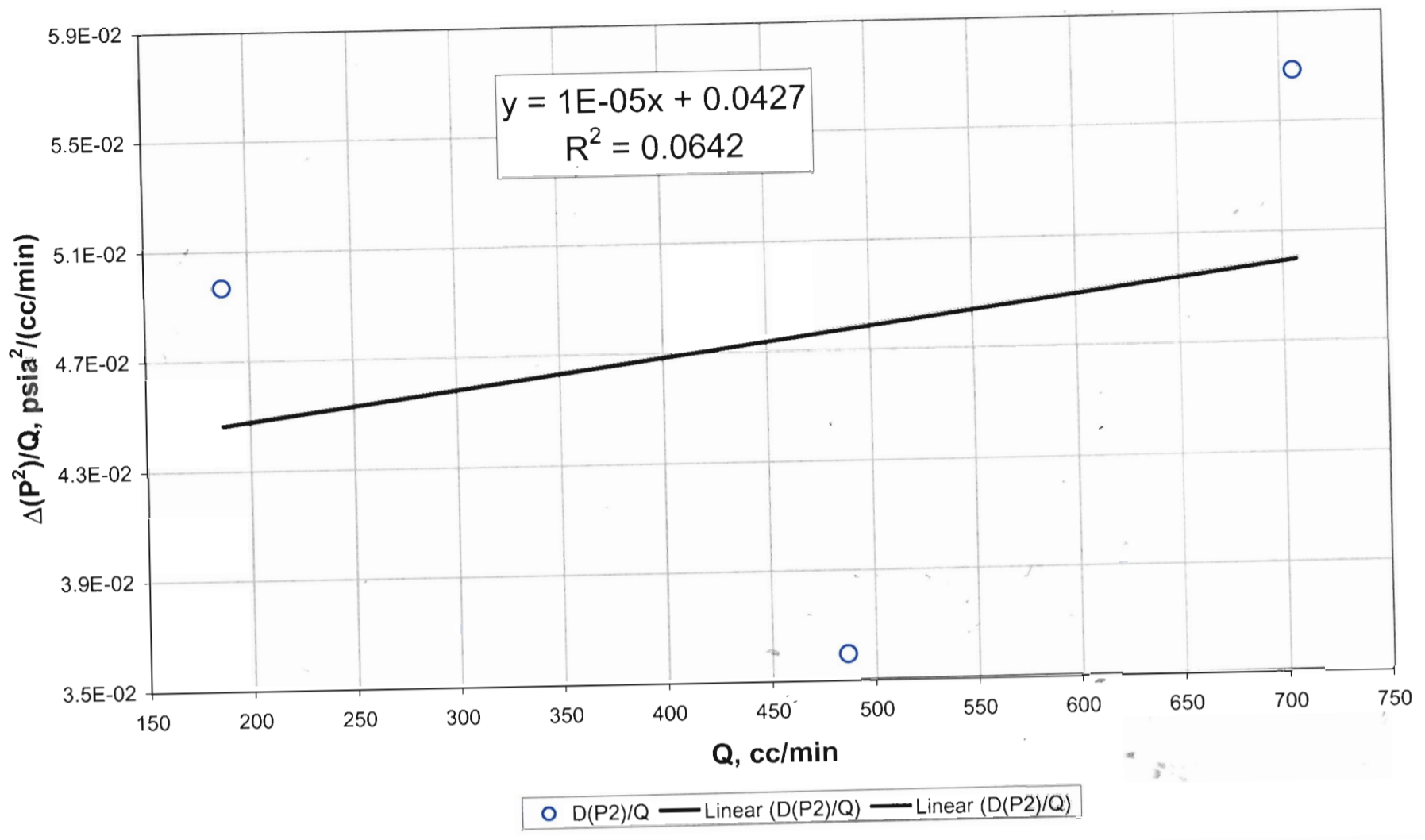


Log-Log plot of differential pressures squared vs. flowrate--used to identify the presence of high-velocity flow effects (when the slope is greater than unity)
 V3 Transect: Drillhole -4

Rmn, 01/29/03

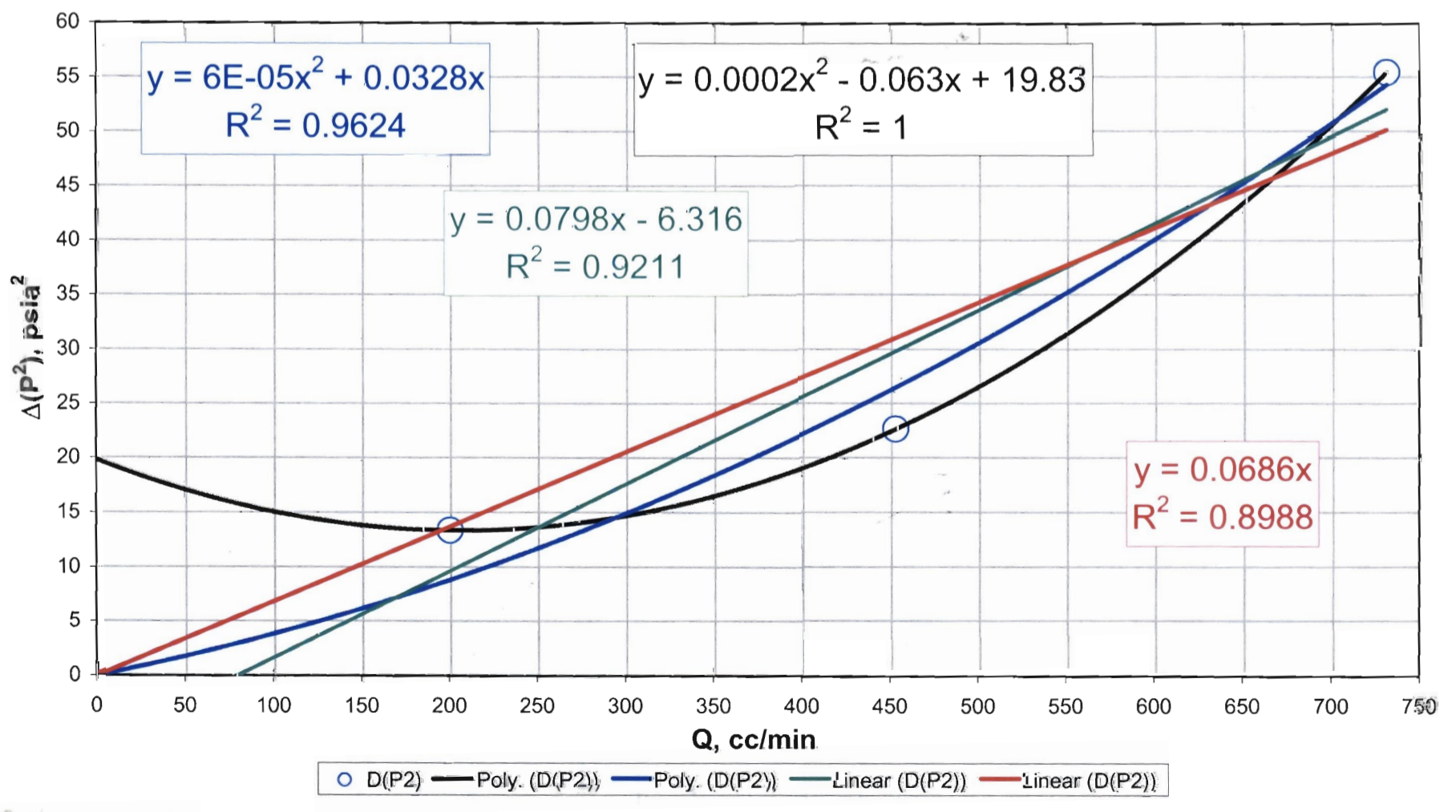


Final check for high velocity flow effects:
 High velocity flow effects are present when the slope is non-zero and positive.
 V3 Transect: Drillhole -4



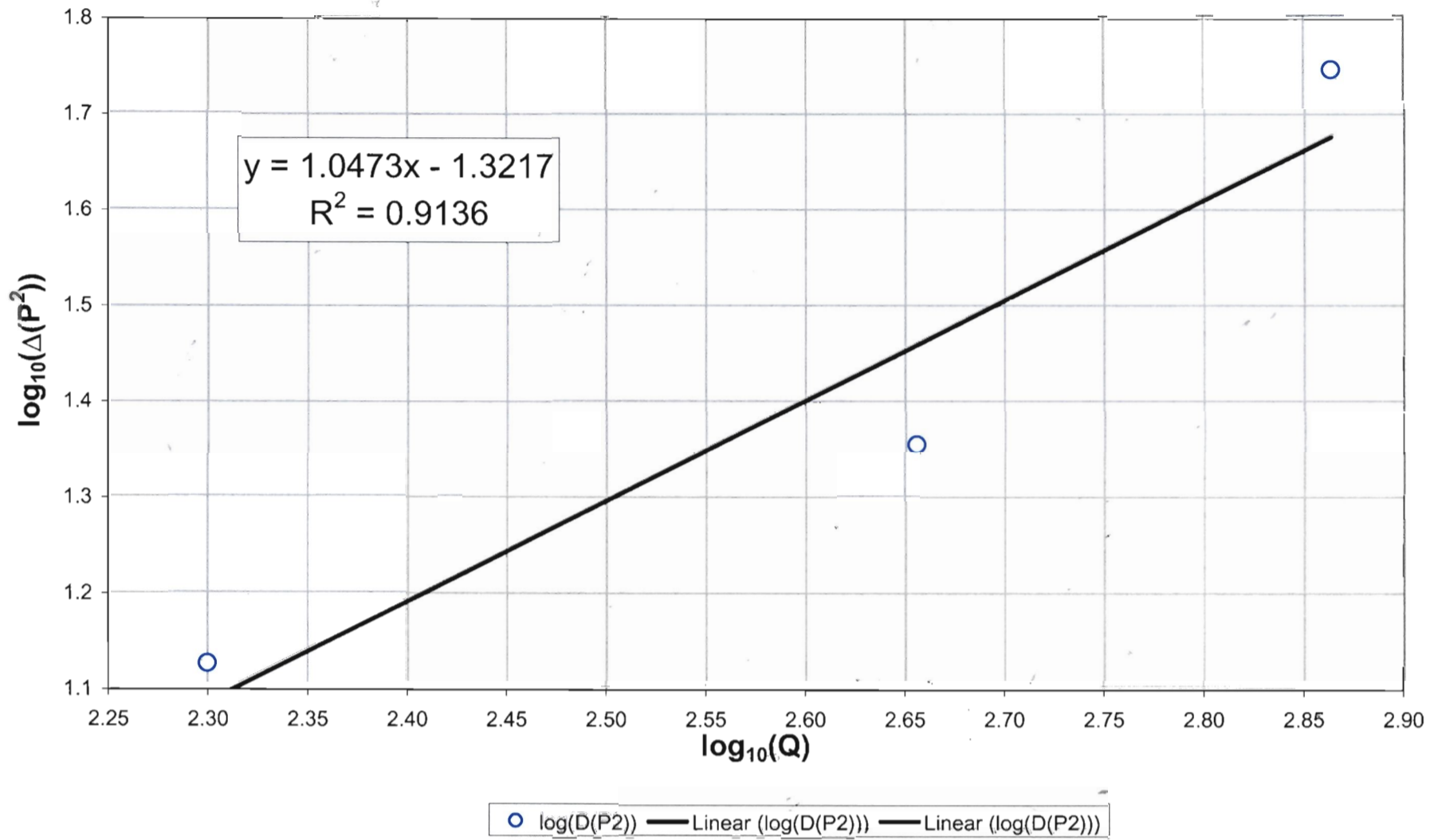
RNM, 01/29/03

Relationship between steady-state differential pressures squared and flowrate:
 If relationship is linear, with the ordinate intercept nearly zero,
 there is no high velocity flow effect.
 V3 Transect: Drillhole -3



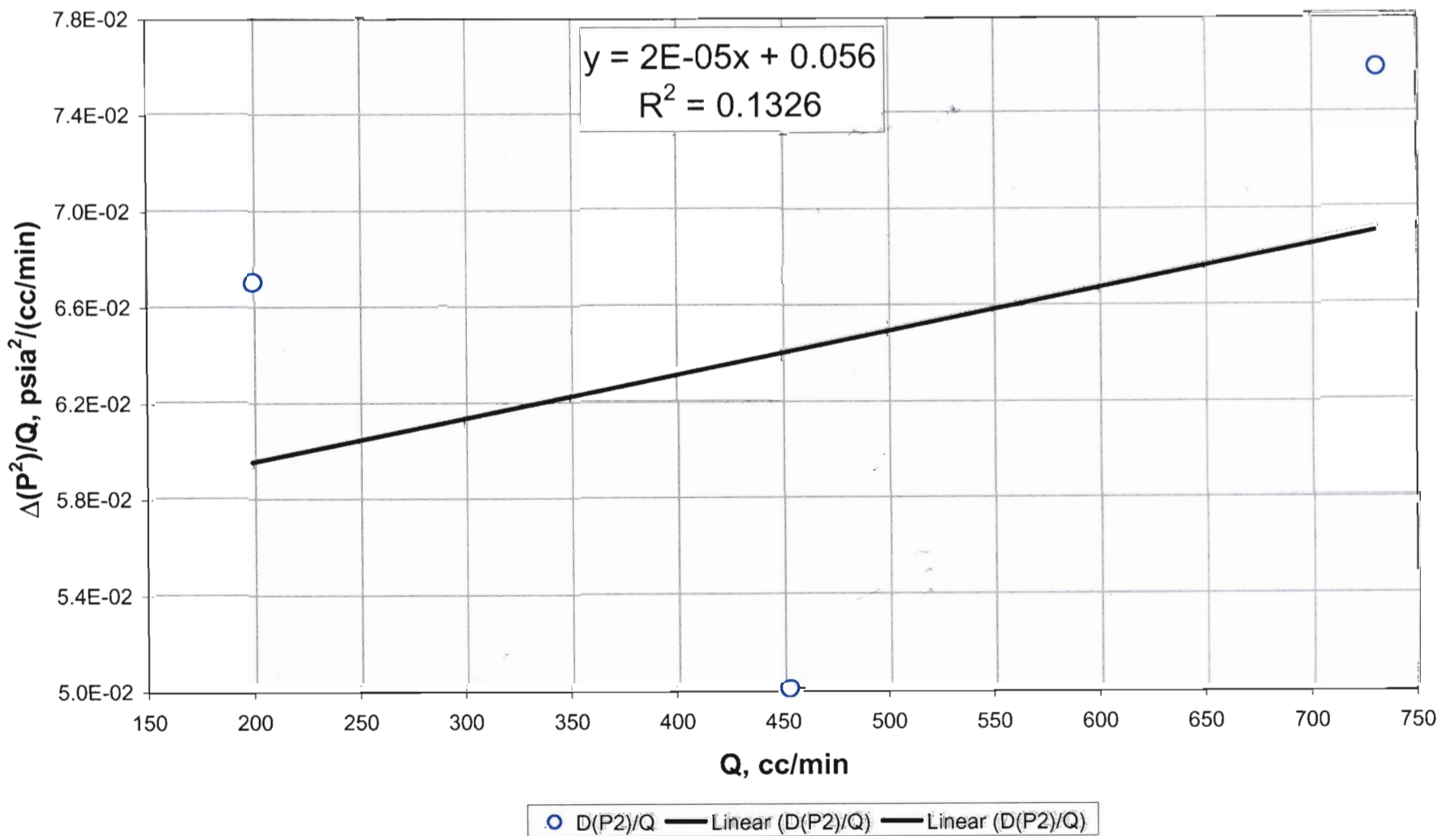
RNM, 01/29/03

Log-Log plot of differential pressures squared vs. flowrate--used to identify the presence of high-velocity flow effects (when the slope is greater than unity)
 V3 Transect: Drillhole -3



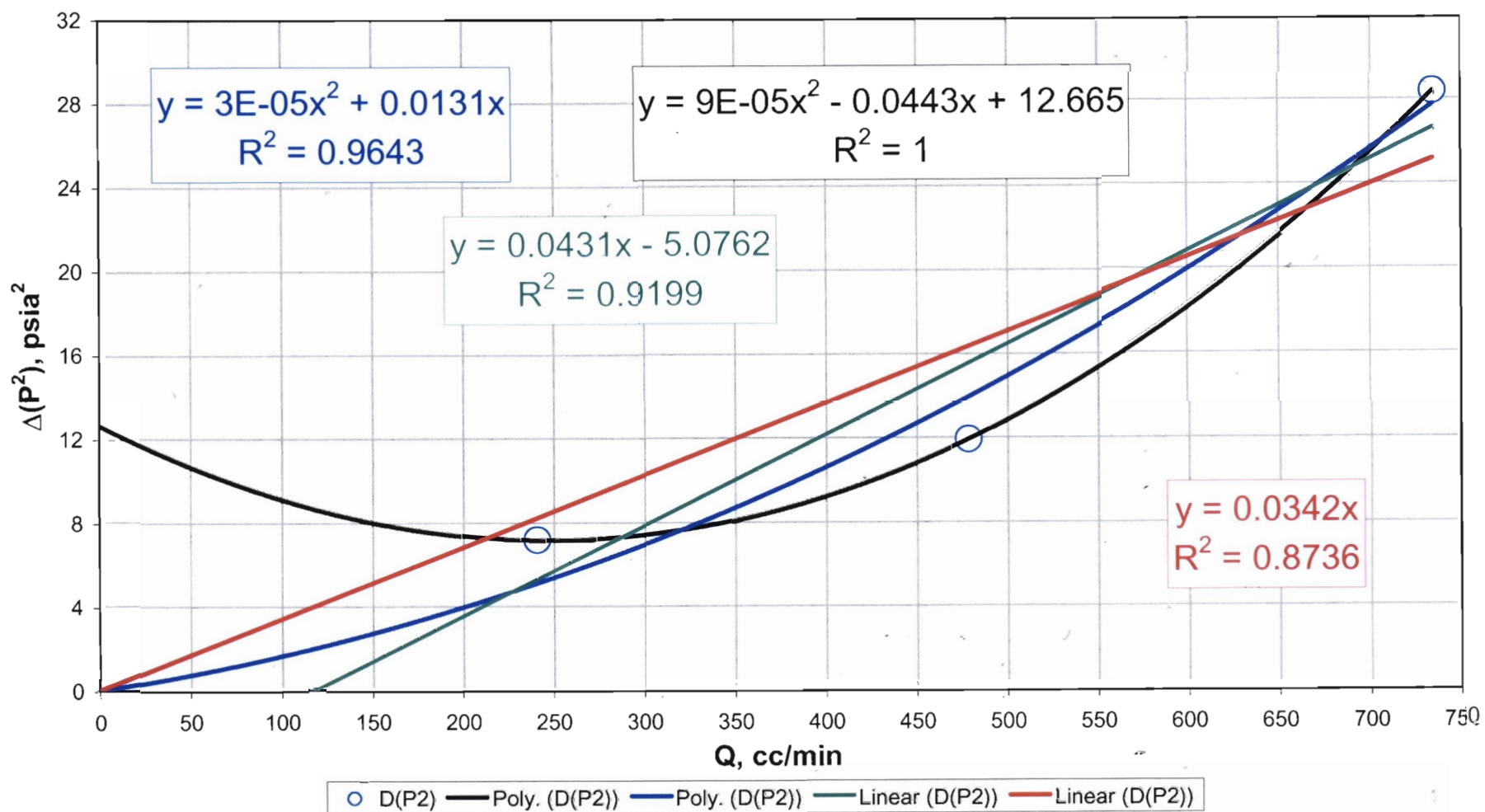
RMN, 01/29/03

Final check for high velocity flow effects:
 High velocity flow effects are present when the slope is non-zero and positive.
 V3 Transect: Drillhole -3

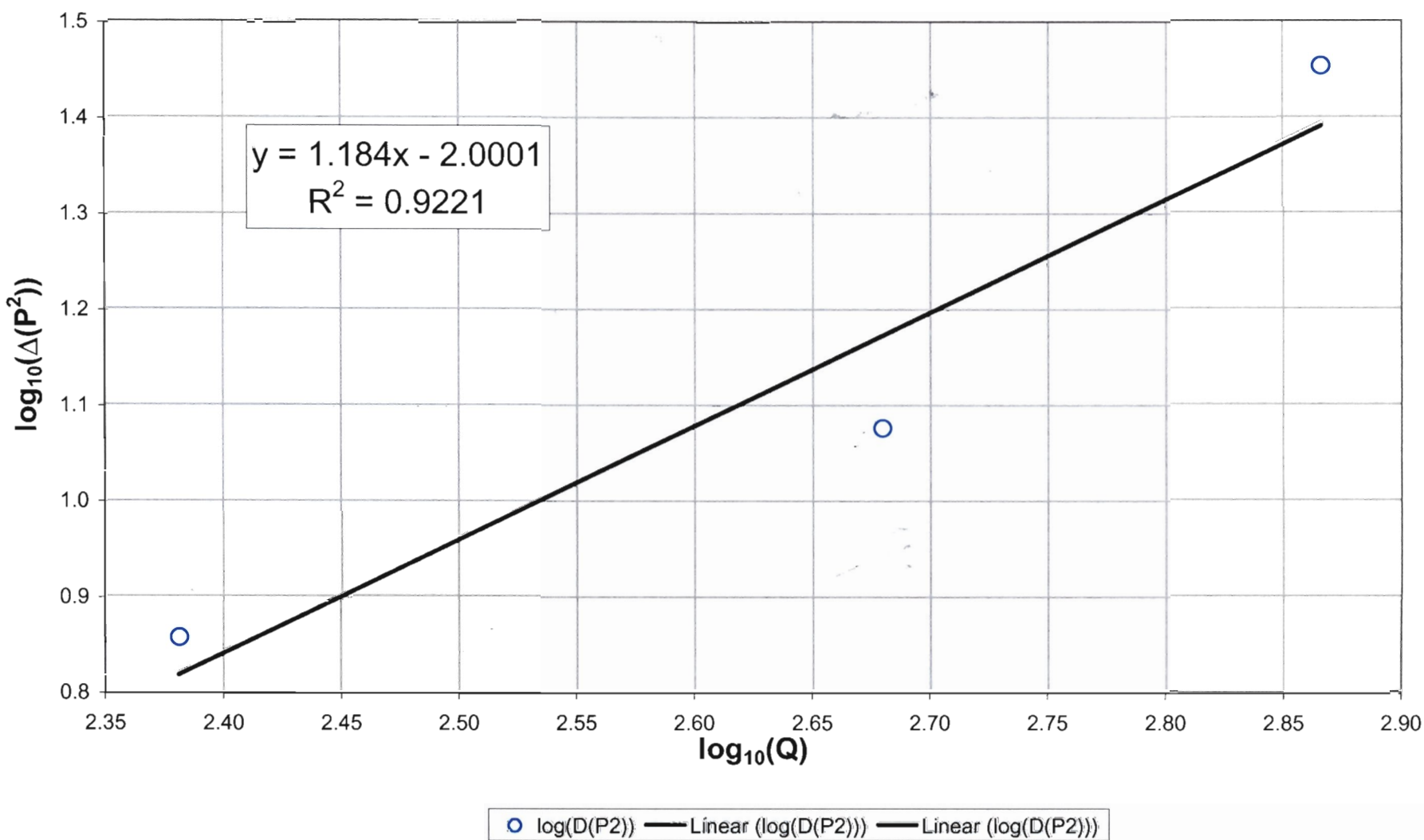


RMN, 01/29/03

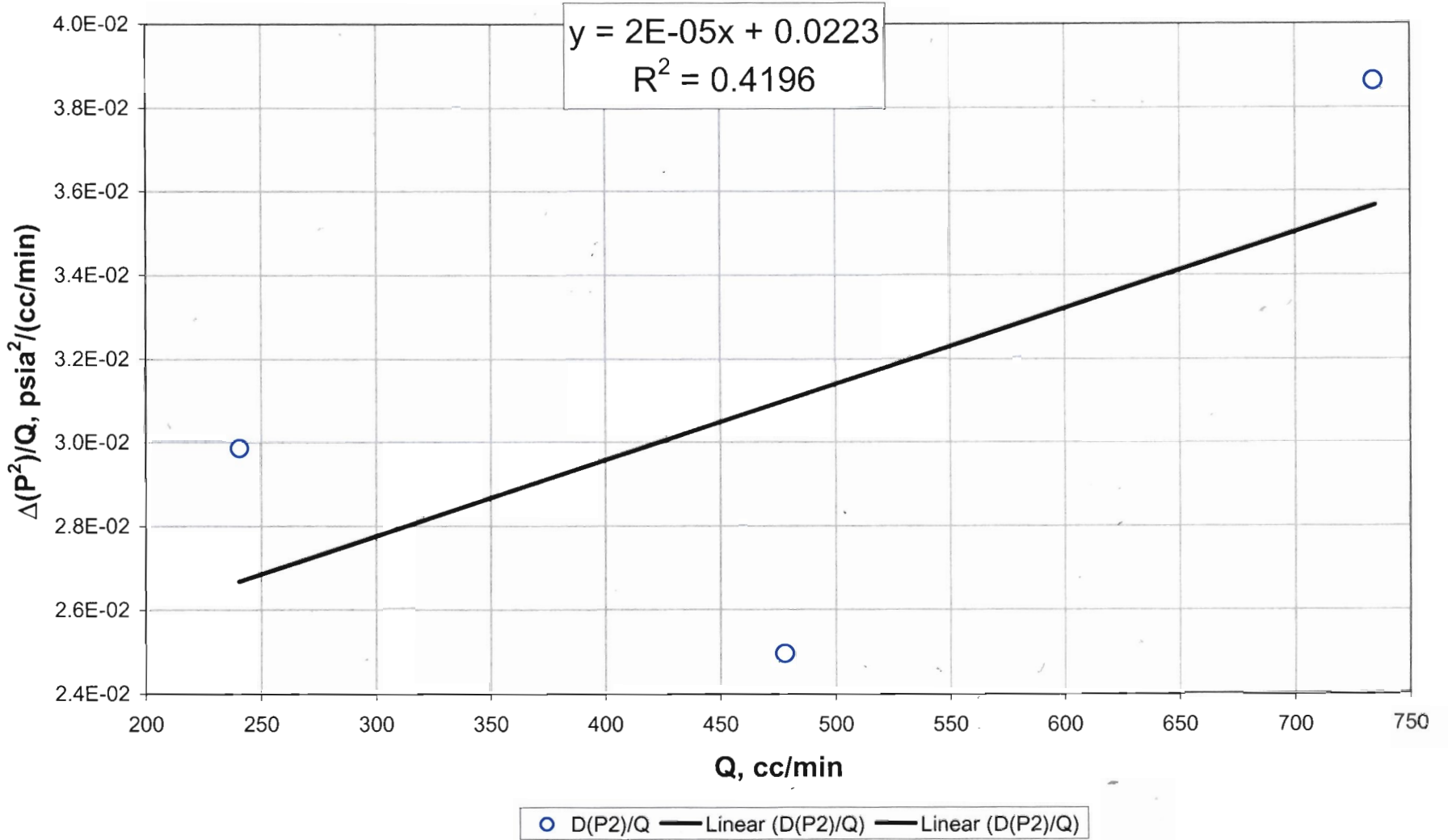
Relationship between steady-state differential pressures squared and flowrate:
 If relationship is linear, with the ordinate intercept nearly zero,
 there is no high velocity flow effect.
 V3 Transect: Drillhole -2



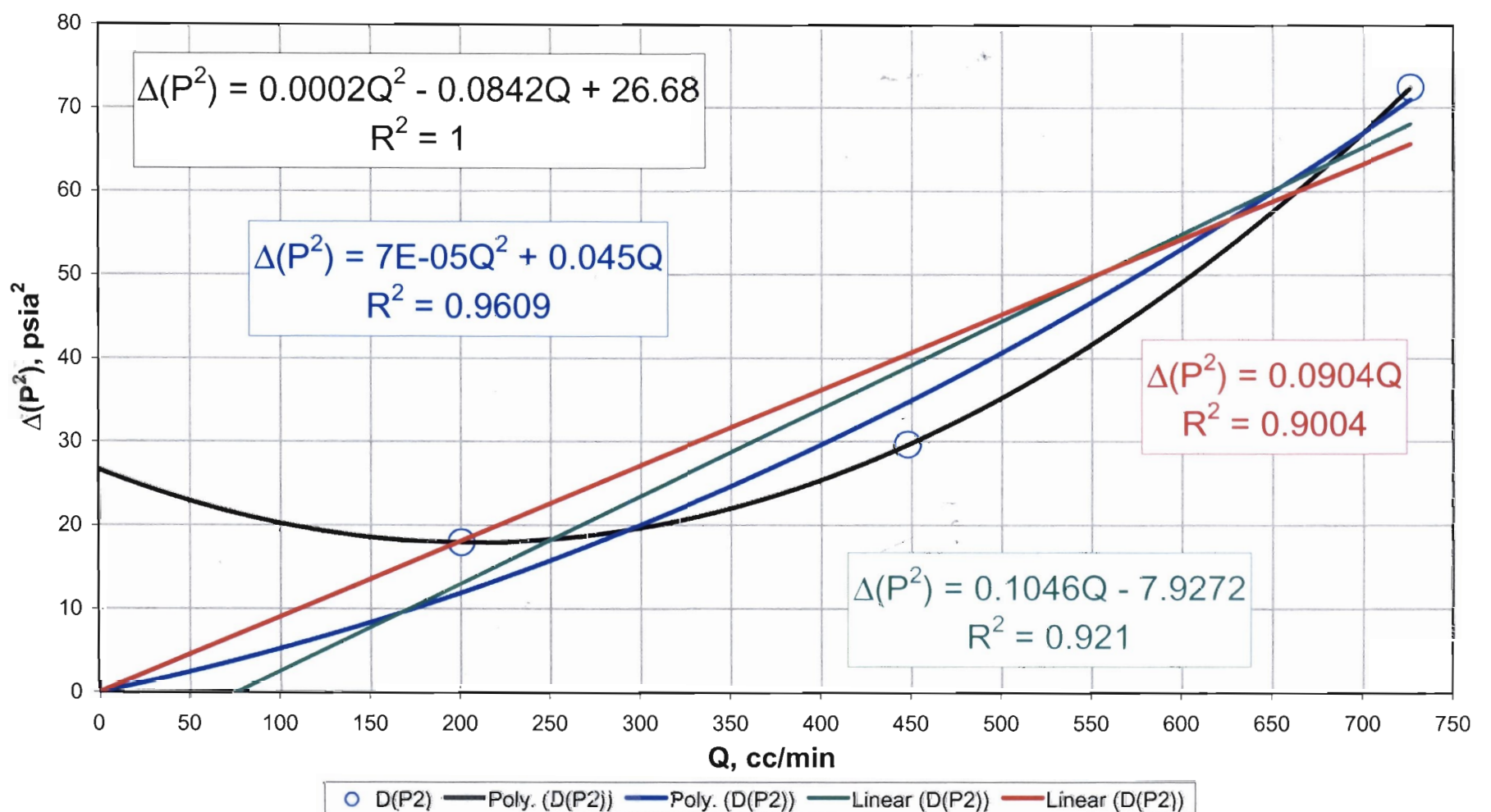
Log-Log plot of differential pressures squared vs. flowrate--used to identify the presence of
 high-velocity flow effects (when the slope is greater than unity)
 V3 Transect: Drillhole -2



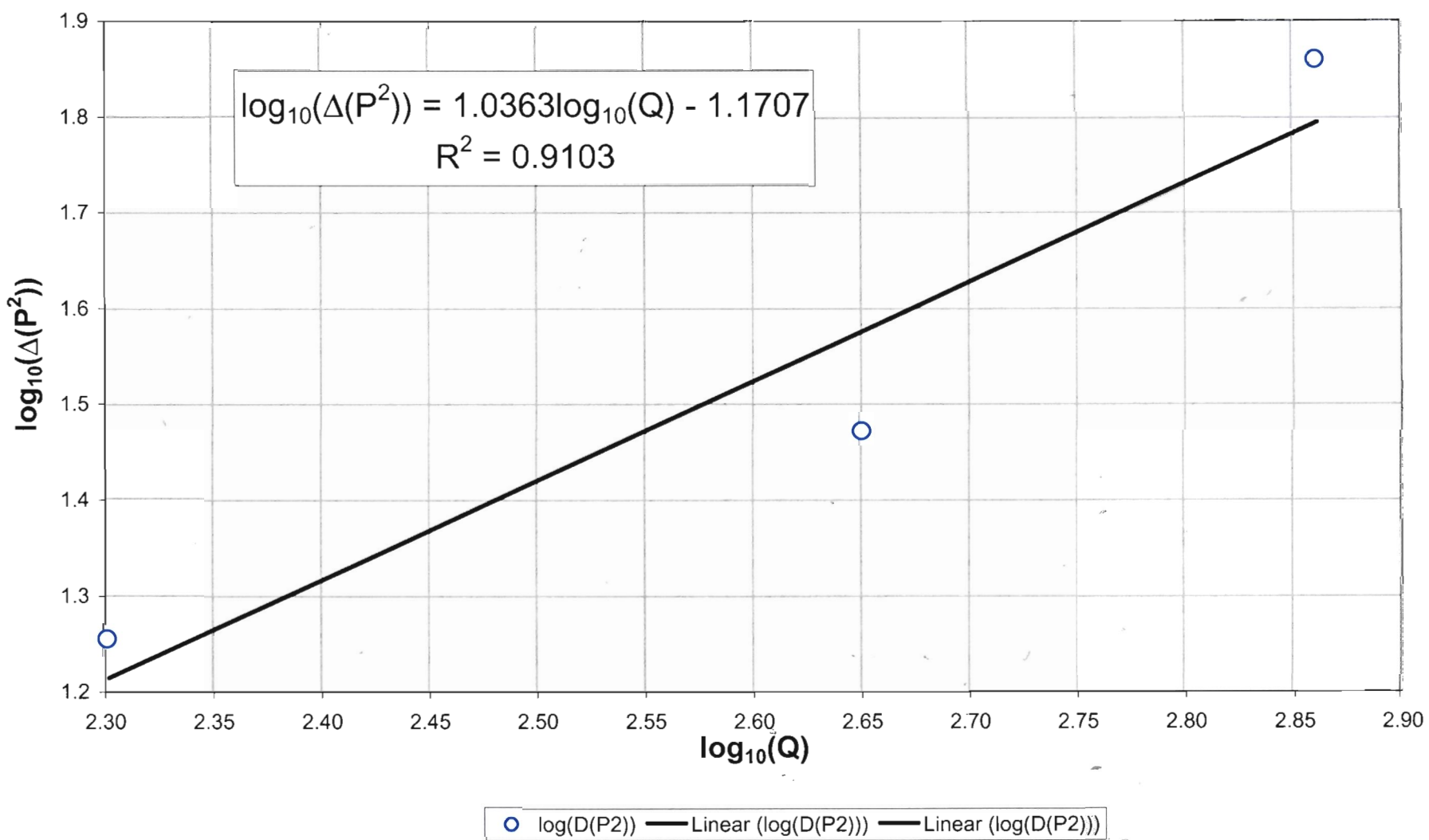
Final check for high velocity flow effects:
 High velocity flow effects are present when the slope is non-zero and positive.
 V3 Transect: Drillhole -2



Relationship between steady-state differential pressures squared and flowrate:
 If relationship is linear, with the ordinate intercept nearly zero,
 there is no high velocity flow effect.
 V3 Transect: Drillhole -1

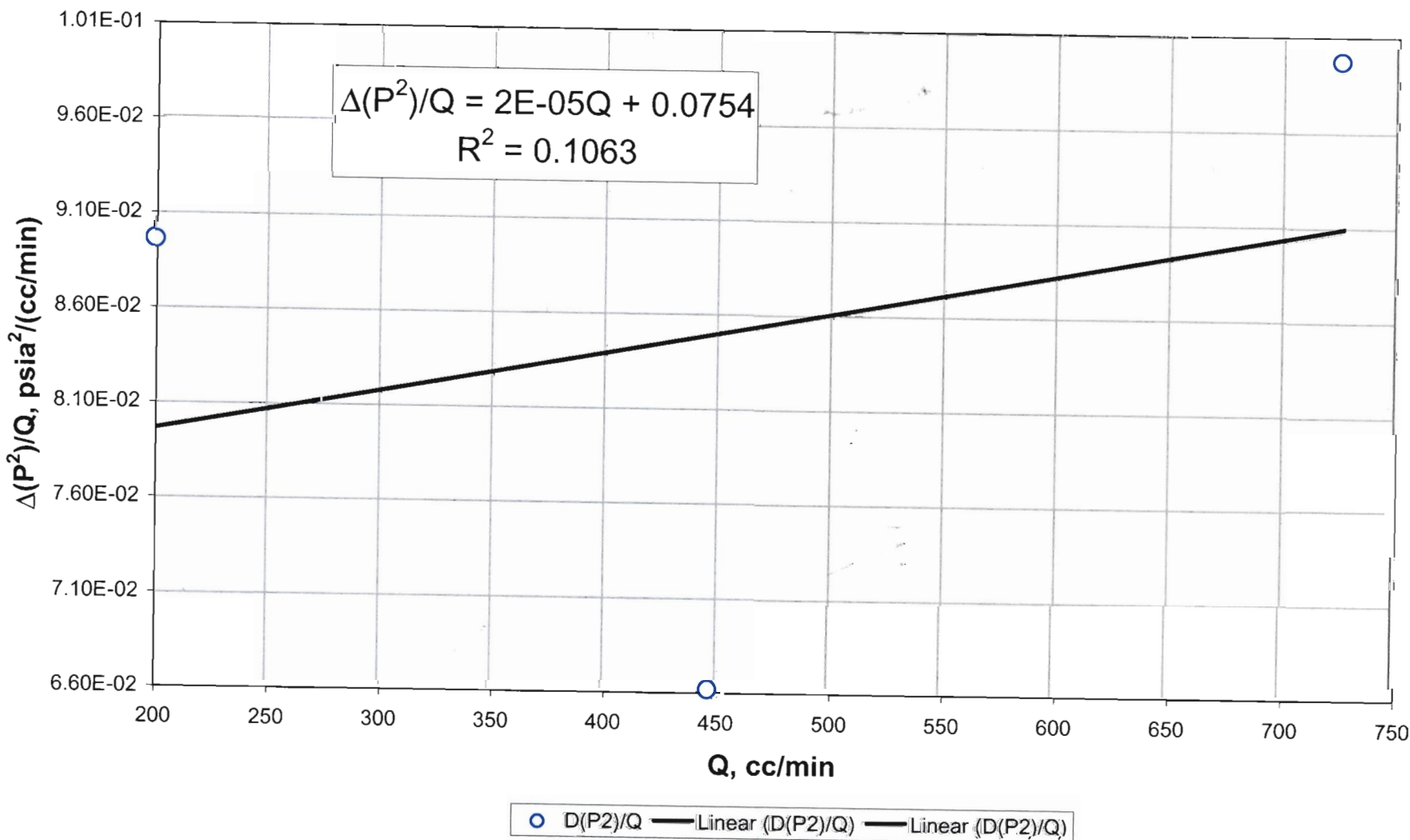


Log-Log plot of differential pressures squared vs. flowrate--used to identify the presence of high-velocity flow effects (when the slope is greater than unity)
V3 Transect: Drillhole -1



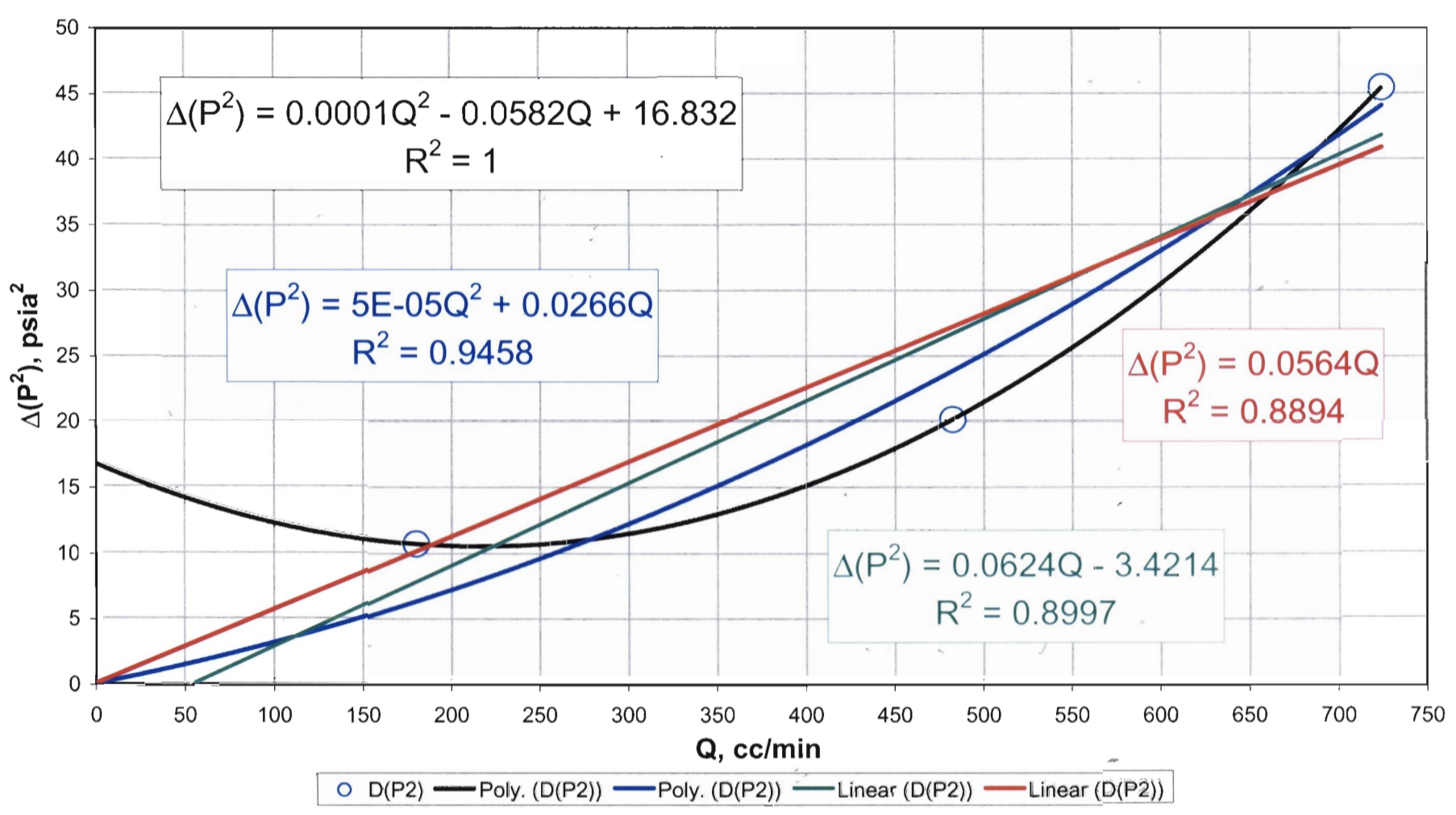
Run on log log

Final check for high velocity flow effects:
High velocity flow effects are present when the slope is non-zero and positive.
V3 Transect: Drillhole -1

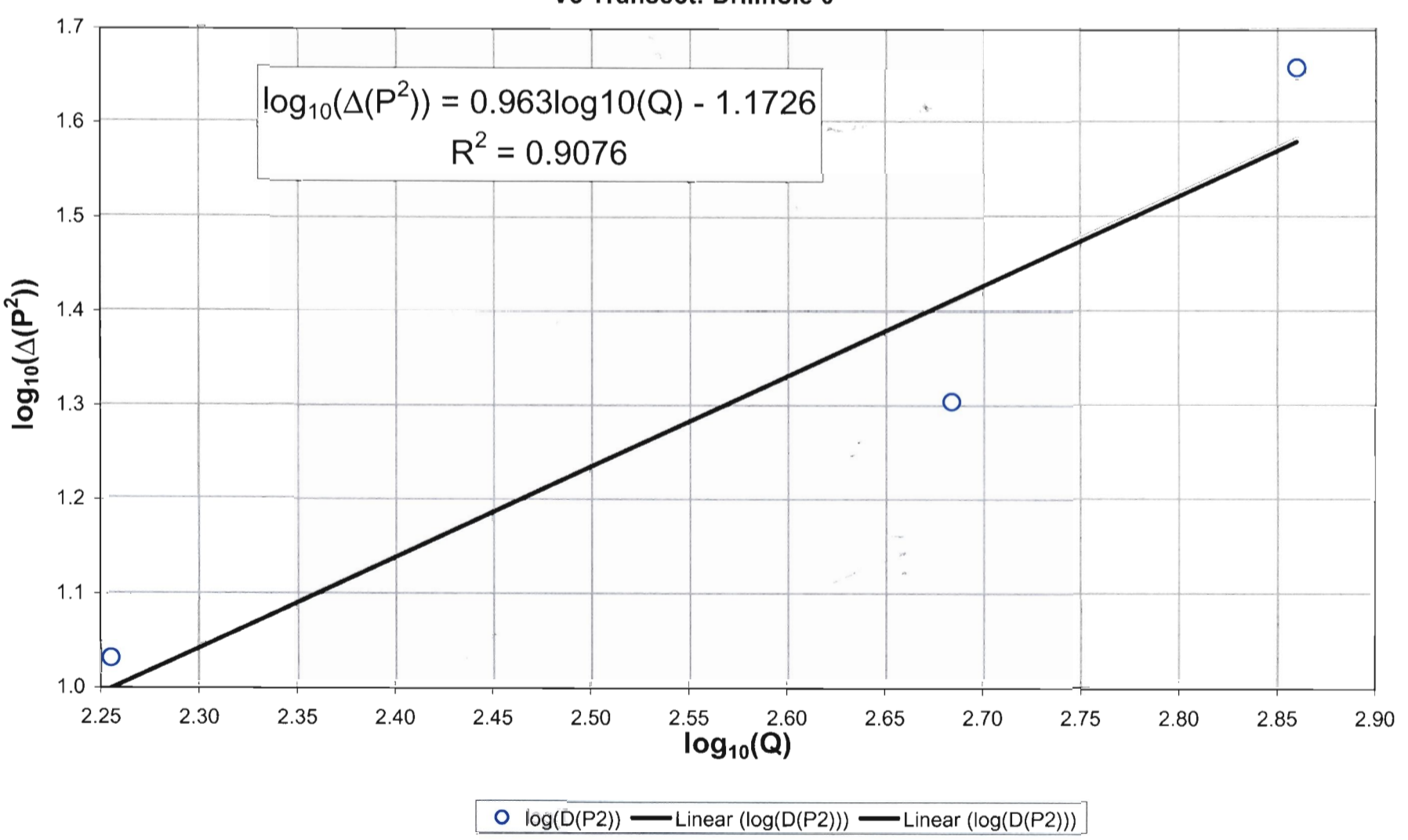


Run on linear

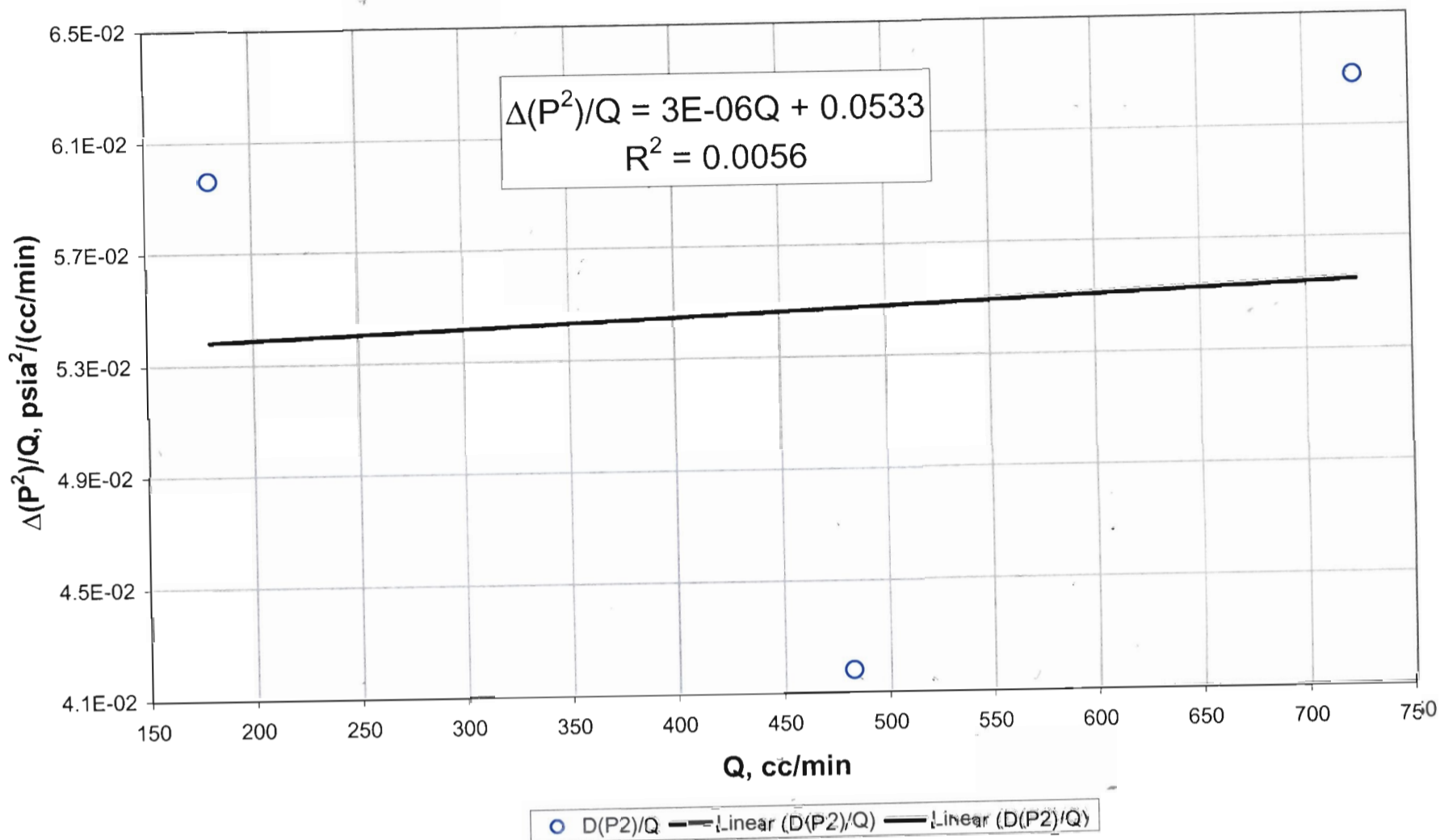
Relationship between steady-state differential pressures squared and flowrate:
 If relationship is linear, with the ordinate intercept nearly zero,
 there is no high velocity flow effect.
 V3 Transect: Drillhole 0



Log-Log plot of differential pressures squared vs. flowrate--used to identify the presence of
 high-velocity flow effects (when the slope is greater than unity)
 V3 Transect: Drillhole 0

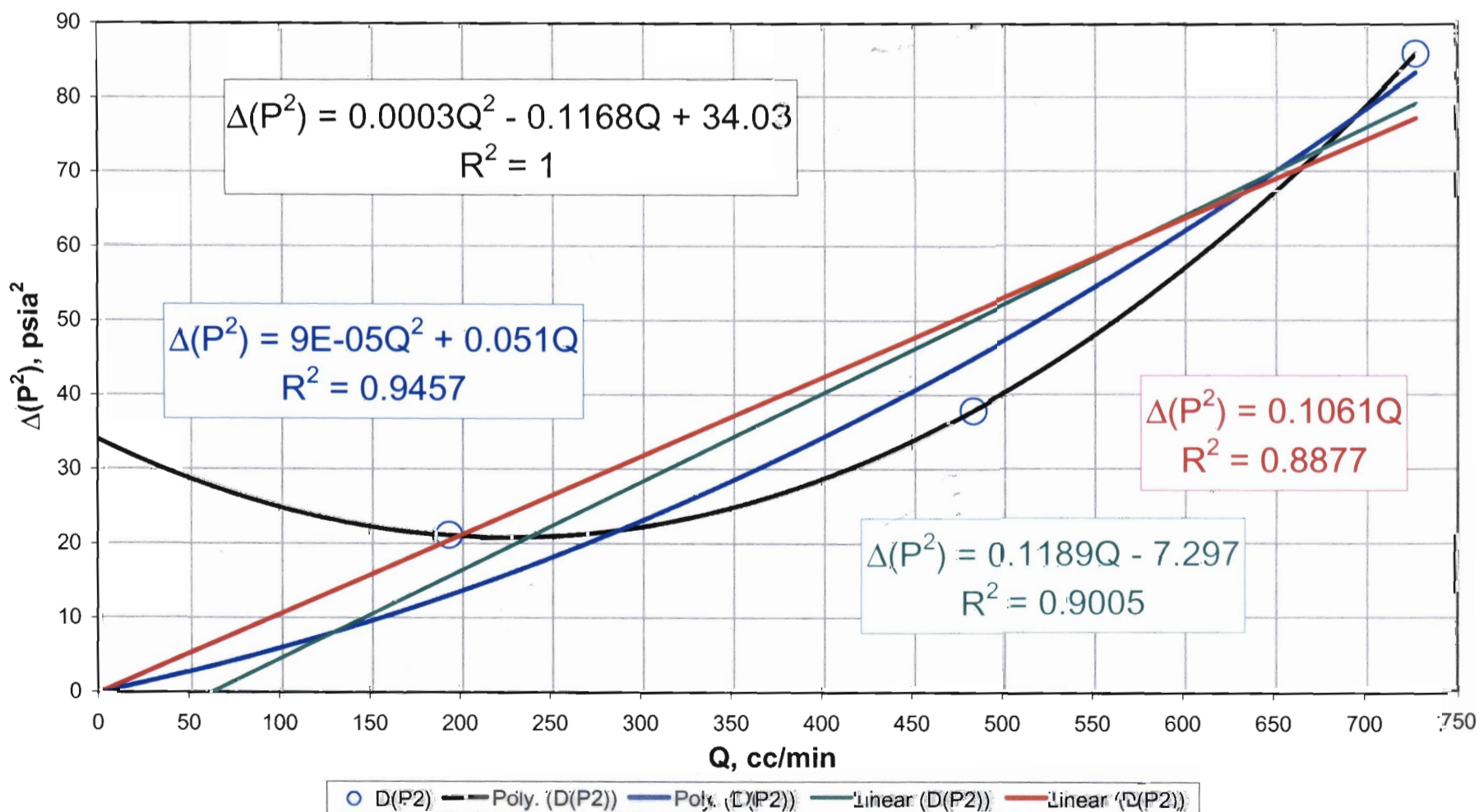


Final check for high velocity flow effects:
 High velocity flow effects are present when the slope is non-zero and positive.
 V3 Transect: Drillhole 0



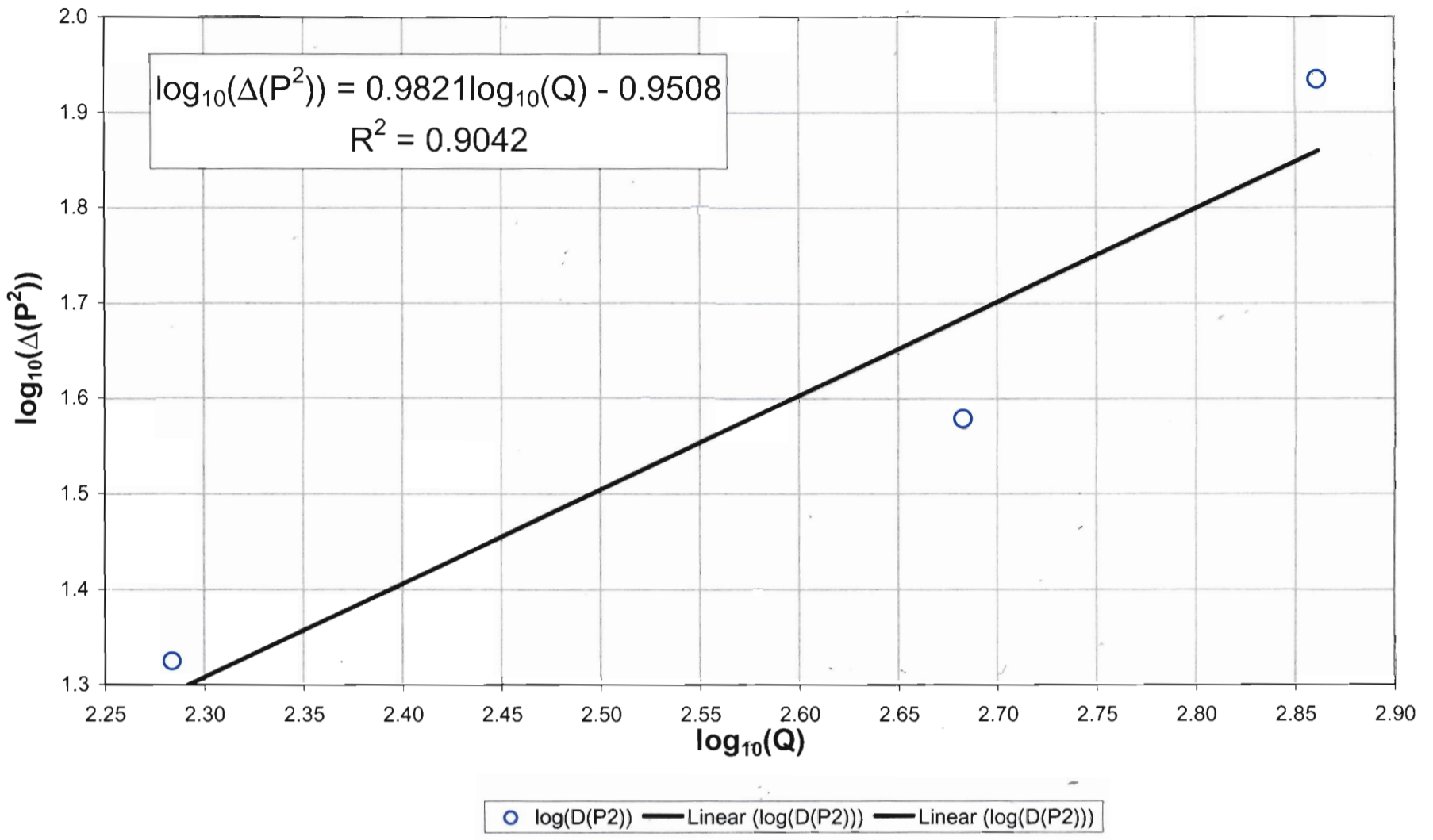
Rmn, 01/29/03

Relationship between steady-state differential pressures squared and flowrate:
 If relationship is linear, with the ordinate intercept nearly zero,
 there is no high velocity flow effect.
 V3 Transect: Drillhole 1



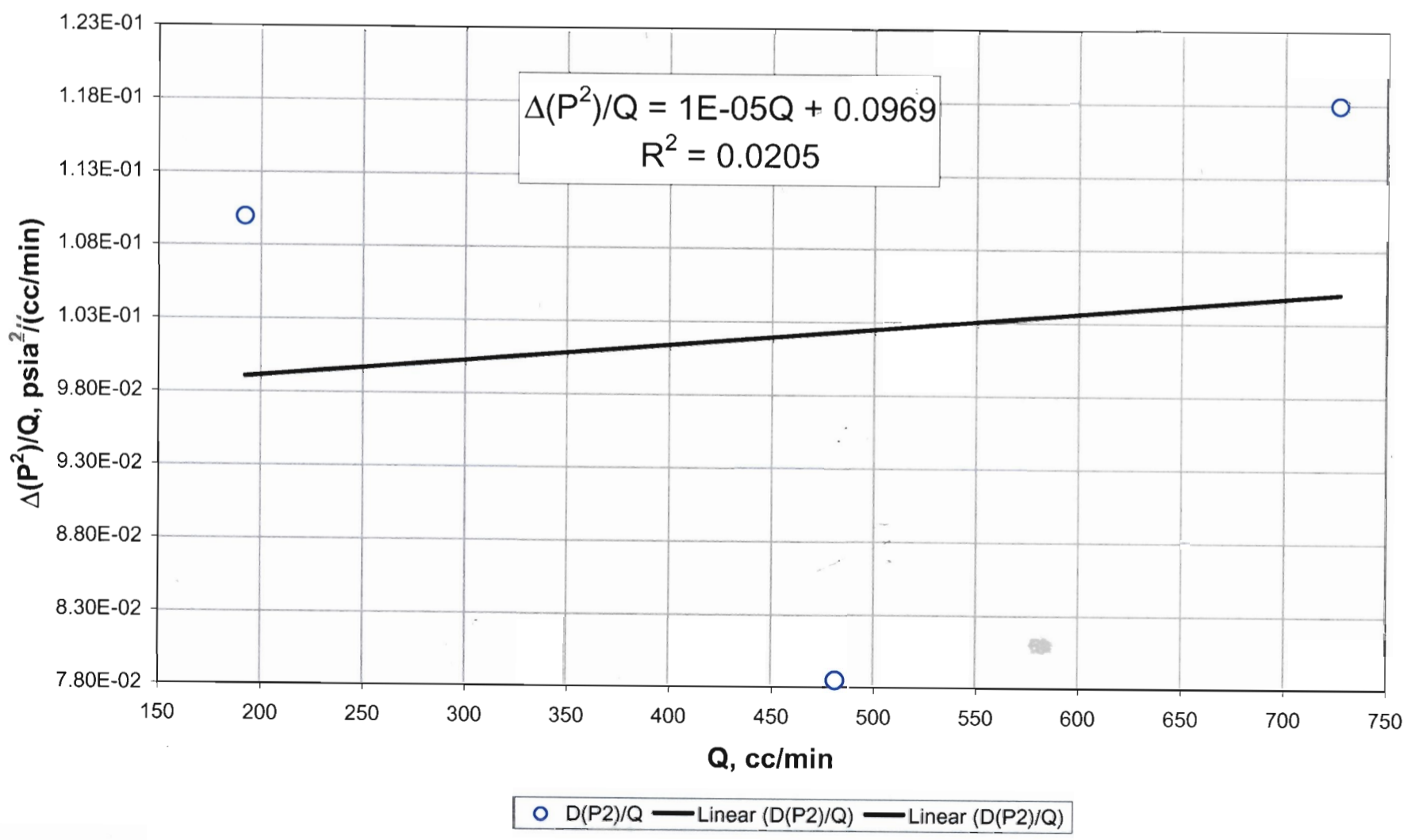
Rmn, 01/29/03

Log-Log plot of differential pressures squared vs. flowrate--used to identify the presence of high-velocity flow effects (when the slope is greater than unity)
V3 Transect: Drillhole 1



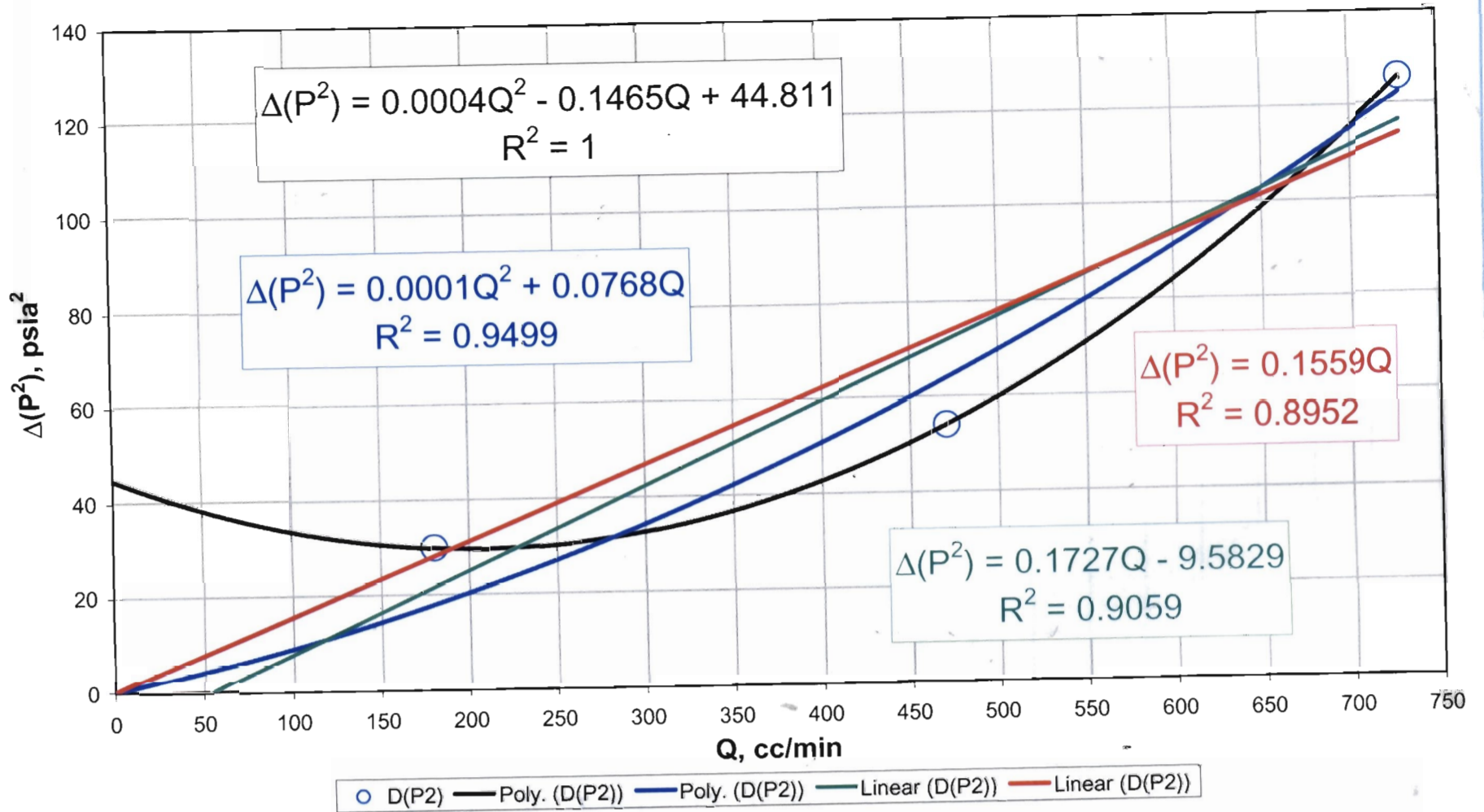
RMM, 01/19/03

Final check for high velocity flow effects:
High velocity flow effects are present when the slope is non-zero and positive.
V3 Transect: Drillhole 1



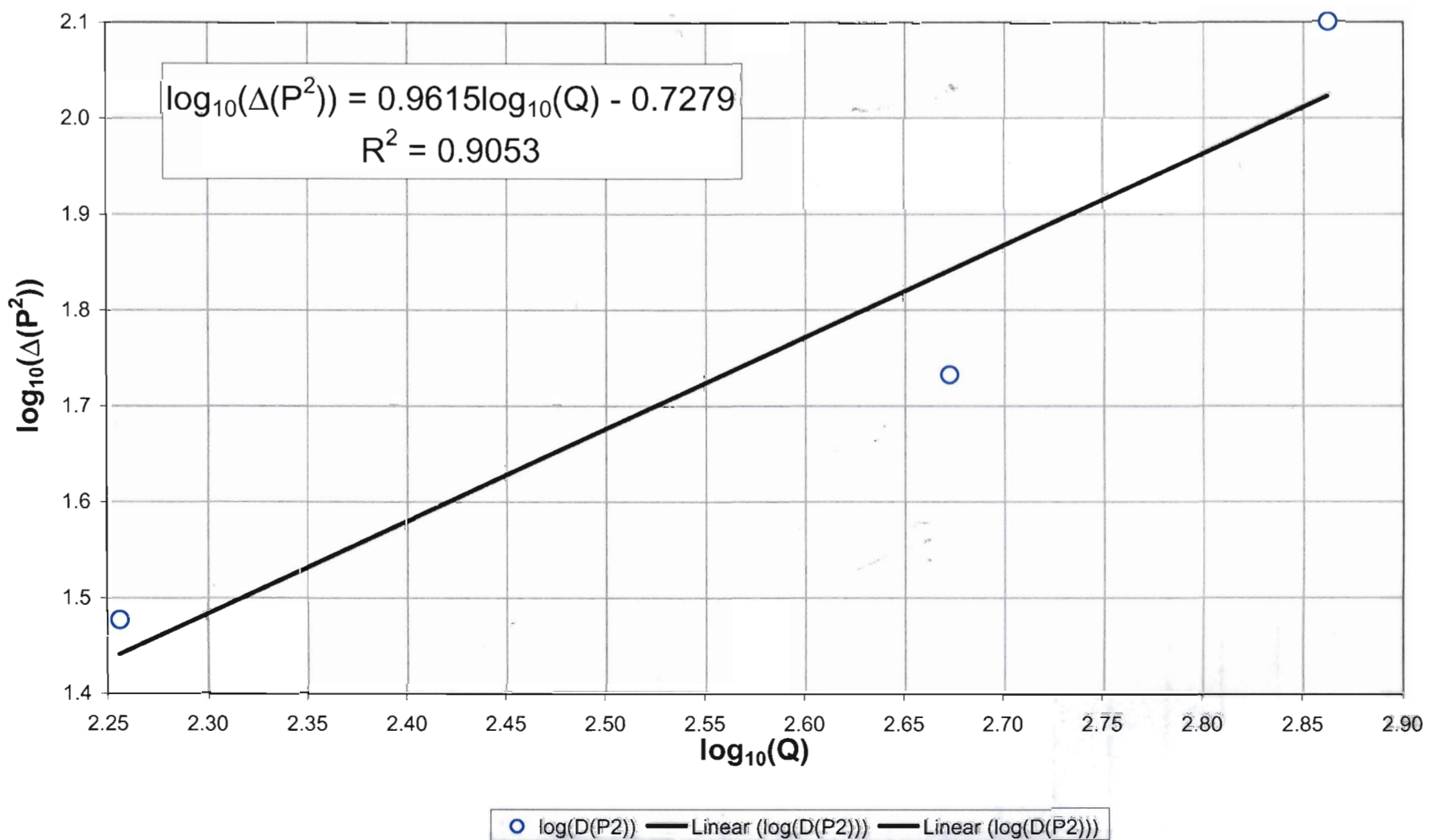
RMM, 01/19/03

Relationship between steady-state differential pressures squared and flowrate:
 If relationship is linear, with the ordinate intercept nearly zero,
 there is no high velocity flow effect.
 V3 Transect: Drillhole 2



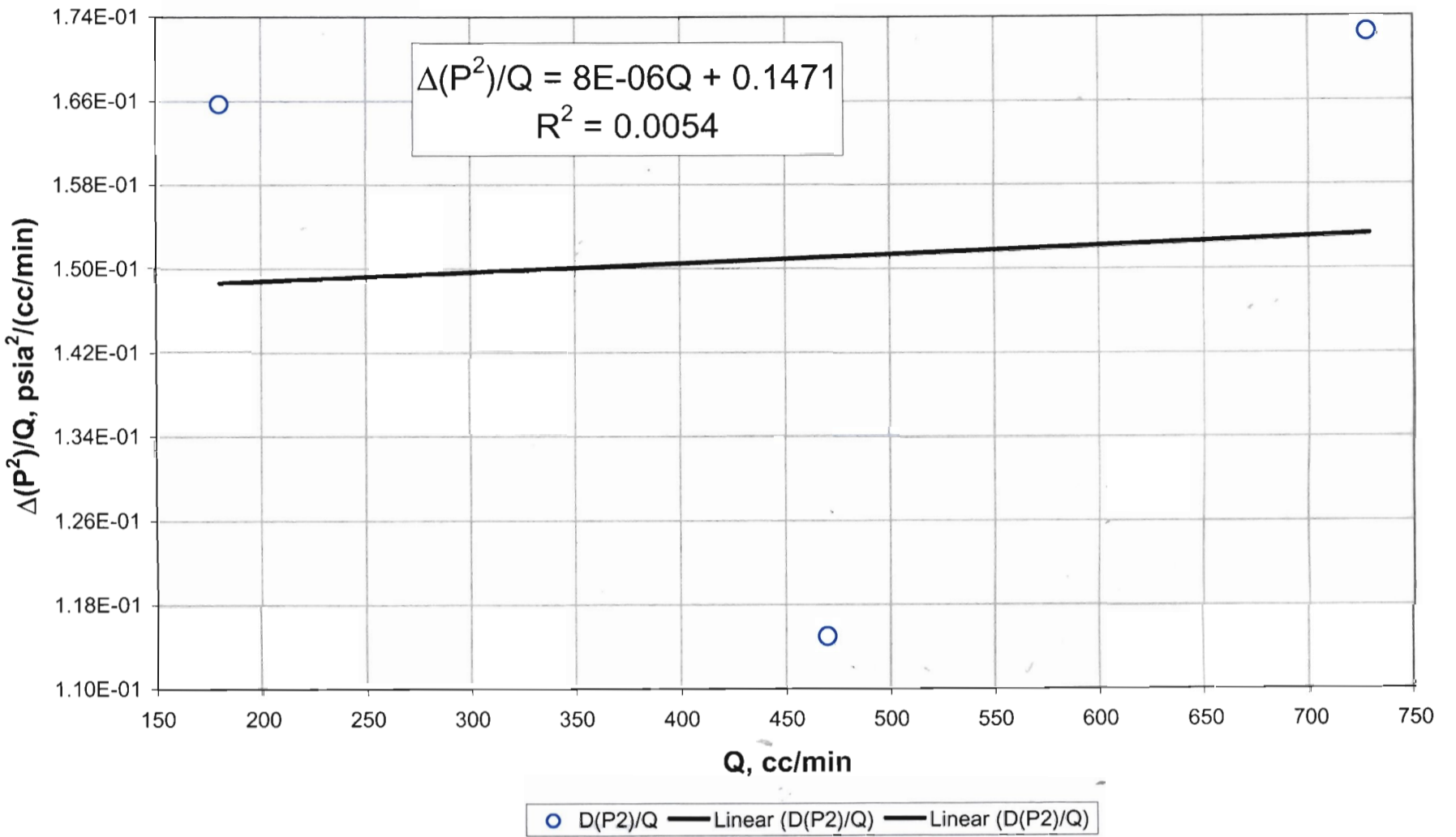
Rmn, 01/28/03

Log-Log plot of differential pressures squared vs. flowrate--used to identify the presence of
 high-velocity flow effects (when the slope is greater than unity)
 V3 Transect: Drillhole 2



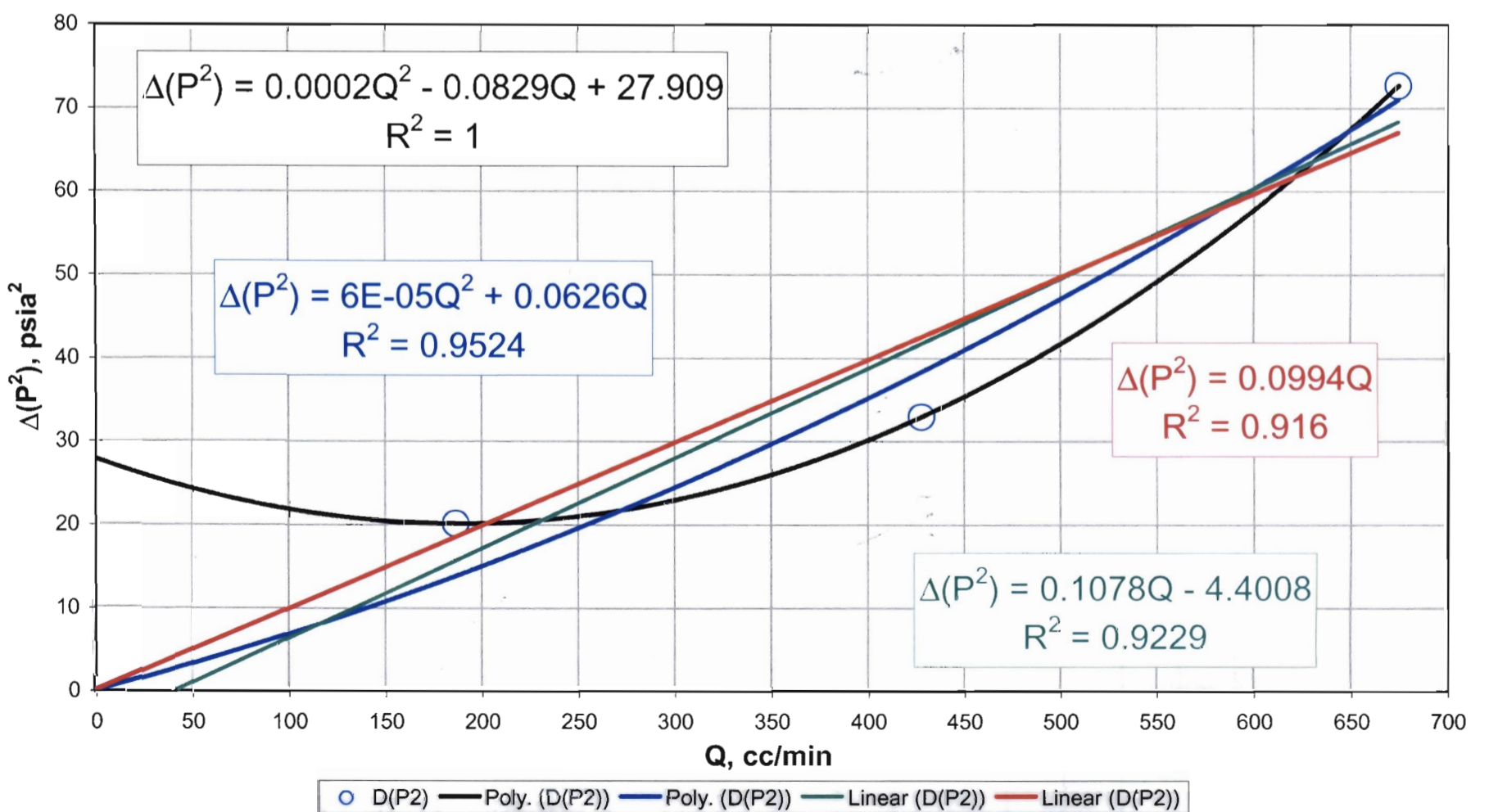
Rmn, 01/28/03

Final check for high velocity flow effects:
 High velocity flow effects are present when the slope is non-zero and positive.
 V3 Transect: Drillhole 2



RNM, 01/14/03

Relationship between steady-state differential pressures squared and flowrate:
 If relationship is linear, with the ordinate intercept nearly zero,
 there is no high velocity flow effect.
 V3 Transect: Drillhole 3



RNM, 01/14/03